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AUTHORS

OF THE ORIGINAL CONTRIBUTIONS WHICH ARE ABSTRACTED IN THIS NUMBER

Araya, R., 130
Ashley, D. D., 142
Ball, C. R., 144
Barnes, R. H., 133
Barnsby, H., 141
Barrie, G., 137
Bashford, E. F., 118
Baum, H. L., 170
Beck, C., 146
Beebe, S. P., 124
Benjamin, A. E., 135
Berg, A. A., 136
Bernstein, H. A., 162
Bevan, A. D., 134
Black, W. D., 169
Blake, J. B., 121
Bland-Sutton, J., 130
Blum, T., 171
Bonome, 143
Bramwell, E., 144
Broad, W. H., 119
Cameron, D. F., 152
Caouette, J., 159
Castex, M. R., 122, 146
Cernezzi, A., 156
Chalfant, S. A., 163
Chaput, H., 119
Churchman, J. W., 141,171
Connellan, P. S., 154
Cook, R. L., 167
Cotton, A., 138
Crisp, W. H., 168
Dean, L. W., 170
Debeyre, A., 128
Decreton, 152
De Forest, H. P., 136
Delbet, P., 128
De Mata, R., 137
Derache, P., 141, 143
Derkel, D., 155
Desmarest, 132
Dodd, V. A., 137
Doyle, E. C., 140
Dujarier, C., 145
Duverger, 168
Favre, R., 152
Field, M. T., 131
Findley, P., 161
Fleischer, M. S., 145
Forgue, E., 151
François, 145
Frank, J., 157
Gage, H., 120
Garcia Parra, I. M., 162
George, F. W., 153
Gosset, 143
Grant, J. D., 127
Gray, O., 140
Green, A. S., 168
Green, L. D., 168
Gregg, J. B., 170
Grulee, C. G., 165
Halstead, A. E., 121
Hammond, T. E., 145
Harris, W., 119
Hartley, J. N. J., 118
Hartwell, J. A., 118
Haynes, R. S., 123
Hazen, H. H., 142
Heald, C. L., 164
Heitger, J. D., 169
Hoag, J. C., 163
Hyde, C. E., 119
Ito, H., 147
Iyer, A. L. A., 162
Jack, H. P., 166
Jeanbrau, E., 149
Karsner, H. T., 149
Kimpton, A. R., 150
Koser, S. A., 147
Lapointe, A., 127
Lawrence, W. S., 153
Levin, I., 152
Levine, M., 152
Losee, J. R., 160
Luys, G., 167
Lyon-Mercado, M., 169
Mabee, O. R., 125
Margarit, F., 131
Matlack, J. A., 128
Mayet, H., 140
Mayo, C. H., 125
Mayo, W. J., 129, 133
McCleary, S., 138
McClelland, J. R., 147
McLeod, A. G., 140
McNeile, L. G., 163
Melchior, L., 132
Meyer, W., 126
Miller, H. A., 163
Milligan, W., 127
Mills, H. W., 156
Mitchell, H. C., 138
Morrison, J. T., 118
Mosti, R., 148
New, G. B., 170
Nogues, P., 165
Northrop, H. L., 131
Ochsner, A. J., 120
Pacini, A. J. P., 136
Pages, F., 158
Pemberton, F. A., 157
Peterson, A., 165
Pfahler, G. E., 123
Platou, E., 137
Primrose, A., 148
Prince, E. M., 164
Ducirel, J., 146
Lewis, R. M., 159
Richter, H. M., 120
Ries, E., 161
Robins, C. R., 158
Roux, S., 143
Serra, A., 138
Shearer, W. L., 170
Smith, F. H., 136
Sneyd, G. C., 139
Speed, K., 121
Spencer, F. R., 168
Stansfeld, A. E., 119
Stewart, F. T., 131
Stone, W. S., 156
Sutton, R. L., 166
Symns, J. L. M., 144
Taylor, J., 140
Tenani, O., 138
Thalhimer, W., 130, 136
Thoma, K. H., 171
Twyman, E. D., 132
Urrutia, L., 129
Veyrassat, 170
Vivie, 154
Voorhees, I. W., 123
Wade, R. B., 142
Walther, C., 118
Walton, H. J., 153
Whittemore, W., 126
Wilensky, A. O., 130
Woolsley, G., 130

TABLE OF CONTENTS

I. Authors ii
II. Index of Abstracts of Current Literature iii
III. Collective Review: War Injuries of the Face and Jaws. *Major Robert H. Ivy, M.R.C., Washington, D.C.* 101–117
IV. Abstracts of Current Literature 118–171
V. Bibliography of Current Literature 172–186

ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY

SURGICAL TECHNIQUE

Operative Surgery and Technique

Walther, C.: Note on a New Method of Treating Elephantiasis of the Limbs 118

Aseptic and Antiseptic Surgery

Morrison, J. T., Hartley, J. N. J., and Bashford, E. F.: Delayed Primary Suture of Wounds 118
Hartwell, J. A.: The Chlorine Antiseptics in Civil Hospital Use 118

Anæsthetics

Chaput, H.: Suppression of Chloroform Vomiting and Syncope by Discontinuous Chloroform Administration 119
Hyde, C. E.: Chloroform Poisoning 119
Hoag, J. C.: Nitrous Oxide Analgesia in Obstetrics ... 163

Surgical Instruments and Apparatus

Harris, W.: A New Apparatus for the Treatment of Foot-Drop 119
Broad, W. H.: A Pylon, or Temporary Artificial Leg 119
Stansfeld, A. E.: An Apparatus for Transfusion of Blood by the Citrate Method 119

SURGERY OF THE HEAD AND NECK

Head

Richter, H. M.: Head Injuries; Demonstration of Two Cases 120
Gage, H.: Some Observations on Injuries of the Head 120
Ochsner, A. J.: Clinical Observations Concerning Malignant Tumors of the Jaws 120
Blake, J. B.: Recurrent Dislocation of the Jaw 121
Speed, K.: Immediate Surgery of Gunshot Wounds of the Cranium; Reviewing 46 Craniotomies Within a Few Hours After the Reception of Wounds 121
Halstead, A. E.: Meningeal Cysts 121
Castex, M. R.: General, Differential and Etiological Diagnosis of Cerebral Tumors 122
Shearer, W. L.: A Few Principles of Harelip and Cleft Palate Procedure 170
Blum, T.: Mouth Surgery, with Special Reference to Cysts of the Jaws 171
Churchman, J. W.: Fibroma of Tongue with Consideration of Other Tumors of the Tongue and Certain Technical Points in Tongue Resection ... 171
Thoma, K. H.: The Histological Pathology of Alveolar Abscesses and Diseased Root-Ends 171

Neck

Haynes, R. S.: The Differential Diagnosis of Enlargement of the Cervical Lymph-Nodes 123
Voorhees, I. W.: Cervical Gangrene Complicating Ludwig's Angina 123
Pfahler, G. E.: Roentgenotherapy in Cervical Adenitis 123
Beebe, S. P.: Ten Cases of Thyroid Disease 124
Mayo, C. H.: The Principles of Thyroid Surgery 125

SURGERY OF THE CHEST

Chest Wall and Breast

Mabee, O. R.: Duct Papilloma and Duct Carcinoma of the Breast 125
Meyer, W.: Postoperative Thoracic Drainage 126
Whittemore, W.: The Surgical Treatment of Empyema 126

Trachea and Lungs

Grant, J. D.: A Case of Pretracheal Abscess of Acute Development, Producing Dysphagia and Dyspnœa 127
Milligan, W.: Fracture of Four Rings of the Trachea; Urgent Dyspnœa; Operation; Recovery 127
Lapointe, A.: Extraction of Intrapulmonary Projectiles 127

Heart and Vascular System

DELBET, P.: Clinical and Operative Study of Foreign Bodies in the Heart 128
DEBEYRE, A.: Late Migration of a Bullet from the Inferior Vena Cava to the Right Ventricle; Section of the Renal Pedicle 128

Pharynx and Œsophagus

MATLACK, J. A : Roentgen Diagnosis of Lesions of the Œsophagus 128

SURGERY OF THE ABDOMEN

Abdominal Wall and Peritoneum

MAYO, W. J.: Secondary Tuberculous Peritonitis; Its Cause and Cure 129
URRUTIA, L.: Diaphragmatic Hernia of the Stomach .. 129
BLAND-SUTTON, J.: Ganglion Neuroma of the Mesentery 130

Gastro-Intestinal Tract

WILENSKY, A. O., and THALHIMER, W.: The Etiological Relationship of Benign Ulcer to Carcinoma of the Stomach 130
WOOLSLEY, G.: The Surgical Aspects of Gastric Hæmorrhage 130
ARAYA, R.: Dyspepsia Due to Perigastritis 130
FIELD, M. T.: Gastroduodenal Perforation; a New Diagnostic Sign 131
STEWART, F. T.: A Method of Permanent Gastrostomy 131
MARGARIT, F.: Perforation of the Duodenum and Formation of a Large Intra-Abdominal Cyst 131
NORTHROP, H. L.: A Pair of Artery Forceps in the Intestinal Tract for Four Years 131
TWYMAN, E. D.: Non-Rotated Ileum with Fatal Intestinal Obstruction Due to Occlusion of the Ileum by the Over-Riding Colon 132
MELCHIOR, L.: Appendicitis and Foreign Bodies 132
DESMAREST: Rectal Palpation in Cancer of the Rectum 132
BARNES, R. H.: Should the Sphincter Muscles Be Divided? 133

Liver, Pancreas, and Spleen

MAYO, W. J.: The Liver and Its Cirrhoses 133
BEVAN, A. D.: A Case of Choledochoplasty and the Demonstration of an Overlooked Common Duct Stone 134
BENJAMIN, A. E.: An Accessory Pancreas with Intussusception 135
PACINI, A. J. P.: Splenectomy in Splenomegalies 136

Miscellaneous

SMITH, F. H.: Acute Abdominal Pain in Children ... 136
DE FOREST, H. P.: Abdominal Injury Due to Blunt Force; Difficult Diagnosis 136

SURGERY OF THE EXTREMITIES

Diseases of the Bones, Joints, Etc.

BERG, A. A., and THALHIMER, W.: Regeneration of Bone 136
DODD, V. A.: Periosteal Sarcoma of the Clavicle 137
BARRIE, G.: Fibrocystic and Cystic Lesions in Bone. 137
PLATOU, E.: Osseous Cysts and So-Called Giant-Cell Sarcoma 137
DE MATA, R.: Interscapular Thoracic Amputation .. 137
COTTON, A., and MCCLEARY, S.: Roentgenograms of a Case of Myxoma of the Femur 138
TENANI, O.: Causalgia and Its Surgical Treatment .. 138

Fractures and Dislocations

MITCHELL, H. C.: Fractures of the Pelvis and Resulting Injuries to the Urethra and Bladder 138
SERRA, A.: Critical Review of the Treatment of Gunshot Fractures of the Long Bones 138
SNEYD, G. C.: Remarks on the Treatment of Fracture of the Lower Limb 139
GRAY, O.: Fracture of the Humerus Complicated with Musculospiral Paralysis 140
MAYET, H.: The Treatment of Elbow Fractures in the Child 140
DOYLE, E. C.: The Treatment of Fractures of the Elbow-Joint 140

Surgery of the Bones, Joints, Etc.

HARRIS, W.: A New Apparatus for the Treatment of Foot-Drop 119
TAYLOR, J., and MCLEOD, A. G.: The Operative Correction of Deformity in Gunshot Fractures 140
DERACHE, P.: Primary Osteosynthesis in War Surgery 141
CHURCHMAN, J. W.: The Treatment of Acute Infections of the Joint by Lavage and Direct Medication 141
BARNSBY, H.: Unilateral Arthrotomy with Total Primary Suture in Wounds of the Knee-Joint 141

Orthopedics in General

BROAD, W. H.: A Pylon, or Temporary Artificial Leg .. 119
HAZEN, H. H.: Syphilis of the Joints 142
ASHLEY, D. D.: Shoes, Physiological and Therapeutic 142
WADE, R. B.: Re-Establishment of the Crippled 142

SURGERY OF THE SPINAL COLUMN AND CORD

DERACHE, GOSSET, and BONOME: Wounds of the Spinal Cord 143
ROUX, S.: Anterior Sacral Meningocele 143

SURGERY OF THE NERVOUS SYSTEM

SYMNS, J. L. M.: A Method of Estimating the Vibratory Sensation, with Some Notes on Its Application in Diseases of the Peripheral and Central Nervous System 144

BALL, C. R.: Tic Douloureux and Its Treatment.... 144
BRAMWELL, E.: Gunshot Wounds of the Peripheral Nerves, with Reference to the Indications for Resection and Suture..... 144
HAMMOND, T. E.: The Involvement of the External and Internal Popliteal Nerves in Lesions of the Sciatic Nerve..... 145
DUJARIER, C., and FRANÇOIS: Twenty Cases of Homoplastic Grafts in Nerve Sections..... 145

MISCELLANEOUS

Clinical Entities—Tumors, Ulcers, Abscesses, Etc.

FLEISHER, M. S.: Immunity and Tissue Transplantation; the Reactions Occurring About Tissue Transplanted into Heterologous Animals..... 145
CASTEX, M. R., and QUEIREL, J.: Moist Gangrene in Raynaud's Disease with Paroxysmal Hæmoglobinuria..... 146
BECK, C.: Conservative Surgery in Children..... 146
KOSER, S. A., and MCCLELLAND, J. R.: The Fate of Bacterial Spores in the Animal Body..... 147
NEW, G. B.: The Use of Heat and Radium in the Treatment of Cancer of the Jaws and Cheeks... 170

Sera, Vaccines, and Ferments

ITO, H.: The Fate of Staphylococcus Pyogenes Aureus Introduced Intravenously into Actively Immunized Dogs, and of Killed Bacteria Introduced Intravenously into Normal Dogs..... 147
MOSTI, R.: The Treatment of War Wounds by Polyvalent Antipyogenic Serum..... 148

Blood

STANSFELD, A. E.: An Apparatus for Transfusion of Blood by the Citrate Method..... 119
PRIMROSE, A.: The Value of the Transfusion of Blood in the Treatment of the Wounded in War..... 148
JEANBRAU, E.: Technique of Transfusion of Blood Sterilized by Citrate of Soda..... 149
KARSNER, H. T.: Transfusion with Tested Bloods, Including the Grouping of One Thousand Bloods and a Method for Use at Advanced Hospitals... 149
KIMPTON, A. R.: Transfusion; Experiences in over Two Hundred Cases..... 150
FINDLEY, P.: Pernicious Anæmia Complicating Pregnancy..... 161

Blood and Lymph Vessels

FORGUE, E.: Arteriovenous Aneurisms in War Surgery..... 151
FAVRE, R.: Obliteration of the Superior Vena Cava; Four Personal Cases..... 152

Poisons

DECRETON: Ignored Syphilis and Surgery..... 152

Roentgenology

CAMERON, D. F.: Aqueous Solutions of Potassium and Sodium Iodides as Opaque Mediums in Roentgenography; Preliminary Report..... 152
LEVIN, I., and LEVINE, M.: The Biological and Clinical Evidence of the Therapeutic Value of Radium and Roentgen Rays in Cancer..... 152
GEORGE, F. W.: The Importance of the Position of the Upper Arm in the Detection of Roentgenological Shadows in the Region of the Shoulder-Joint..... 153
LAWRENCE, W. S.: A Method of Obtaining an Accurate Lateral Roentgenogram of the Shoulder-Joint..... 153
WALTON, H. J.: Roentgenological Examination of the Mediastinum..... 153

MILITARY SURGERY

MORRISON, J. T., HARTLEY, J. N. J., and BASHFORD, E. F.: Delayed Primary Suture of Wounds..... 118
GAGE, H.: Some Observations on Injuries of the Head 120
SPEED, K.: Immediate Surgery of Gunshot Wounds of the Cranium; Reviewing 46 Craniotomies Within a Few Hours After the Reception of Wounds..... 121
LAPOINTE, A.: Extraction of Intrapulmonary Projectiles..... 127
DELBET, P.: Clinical and Operative Study of Foreign Bodies in the Heart..... 128
DEBEYRE, A.: Late Migration of a Bullet from the Inferior Vena Cava to the Right Ventricle; Section of the Renal Pedicle..... 128
MITCHELL, H. C.: Fractures of the Pelvis and Resulting Injuries to the Urethra and Bladder..... 138
SERRA, A.: Critical Review of the Treatment of Gunshot Fractures of the Long Bones..... 138
TAYLOR, J., and MCLEOD, A. G.: The Operative Correction of Deformity in Gunshot Fractures..... 140
DERACHE, P.: Primary Osteosynthesis in War Surgery..... 141
CHURCHMAN, J. W.: The Treatment of Acute Infections of the Joint by Lavage and Direct Medication..... 141
BARNSBY, H.: Unilateral Arthrotomy with Total Primary Suture in Wounds of the Knee-Joint... 141
WADE, R. B.: Re-Establishment of the Crippled.... 142
DERACHE, GOSSET, and BONOME: Wounds of the Spinal Cord..... 143
BRAMWELL, E.: Gunshot Wounds of the Peripheral Nerves, with Reference to the Indications for Resection and Suture..... 144
DUJARIER, C., and FRANÇOIS: Twenty Cases of Homoplastic Grafts in Nerve Sections..... 145
MOSTI, R.: The Treatment of War Wounds by Polyvalent Antipyogenic Serum..... 148
PRIMROSE, A.: The Value of the Transfusion of Blood in the Treatment of the Wounded in War. 148
JEANBRAU, E.: Technique of Transfusion of Blood Sterilized by Citrate of Soda..... 149
KARSNER, H. T.: Transfusion with Tested Bloods, Including the Grouping of One Thousand Bloods and a Method for Use at Advanced Hospitals... 149

FORGUE, E.: Arteriovenous Aneurisms in War Surgery 151
VIVIE: Functioning of Advanced Army Surgical Posts 154
CONNELLAN, P. S.: War Surgery in an Indian General Hospital in Mesopotamia 154
DERKEL, D.: The French Sanitary Service 155
NOGUES, P.: Kidney Traumatisms in Ambulance Service at the Front 165
DUVERGER: Resection of the Anterior Segment as an Operation of Urgency in War Wounds of the Ocular Globe 168

GYNECOLOGY

Uterus

STONE, W. S.: An Estimate of Radium Therapy in Uterine Cancer 156
MILLS, H. W.: Sarcomatous Degeneration of Uterine Fibroids; Report of Two Cases 156
CERNEZZI, A.: Surgical Intervention in Uterine Fibromyomata 156
FRANK, J.: Obstructive Dysmenorrhœa and Sterility; a New Operation 157
PEMBERTON, F. A.: Hæmorrhage from the Uterus in the Non-Pregnant Woman 157
ROBINS, C. R.: The Pathological Uterus at the Menopause 158

Adnexal and Periuterine Conditions

PAGES, F.: Giant Para-Ovarian Cyst 158

External Genitalia

RAWLS, R. M.: A Preliminary Report of an Operation for Cystocele 159

Miscellaneous

CAOUETTE, J.: Notes of Gynecological Practice 159

OBSTETRICS

Pregnancy and Its Complications

LOSEE, J. R.: The Cæsarean Scar; an Anatomical Study 160
RIES, E.: The Treatment of Septic Abortion 161
FINDLEY, P.: Pernicious Anæmia Complicating Pregnancy 161
IYER, A. L. A.: Split Pelvis 162

Labor and Its Complications

BERNSTEIN, H. A.: The Immediate Operation for Perineal Lacerations 162
GARCIA PARRA, I. M.: Spontaneous Rupture of the Uterus During Labor; Uterine Fibroma 162
HOAG, J. C.: Nitrous Oxide Analgesia in Obstetrics 163

Puerperium and its Complications

MCNEILE, L. G.: The Effect of Ingestion of Desiccated Placenta During the First Eleven Days of Lactation 163
MILLER, H. A., and CHALFANT, S. A.: The Treatment of Puerperal Blood Stream Infection by Means of Arsenobenzol, with Report of Cases 163

Miscellaneous

PRINCE, E. M.: Anatomical Defects in the Newborn Demanding Surgical Operation; Report of a Case of Uterine Tumor 164
HEALD, C. L.: Artificial Respiration in Asphyxia Neonatorum 164

GENITO-URINARY SURGERY

Kidney, and Ureter

NOGUES, P.: Kidney Traumatisms in Ambulance Service at the Front 165
GRULEE, C. G.: Diagnosis and Treatment of Pyelocystitis in Infancy 165
PETERSON, A.: The Effect on the Kidney of Ureterovesical Anastomosis; Experimental and Clinical Report 165

Bladder, Urethra, and Penis

JACK, H. P.: A New Technique for Bladder Drainage 166
SUTTON, R. L.: Subcutaneous Injections of Oxygen in the Treatment of Balanitis Gangrænosa 166

Genital Organs

COOK, R. L.: Surgical Treatment of Epididymitis 167
LUYS, G.: Boring Through the Prostate in the Treatment of Hypertrophy 167

SURGERY OF THE EYE AND EAR

Eye

DUVERGER: Resection of the Anterior Segment as an Operation of Urgency in War Wounds of the Ocular Globe 168
CRISP, W. H.: The History of the Operation for Cataract 168
SPENCER, F. R.: The Rôle of the Ductless Glands in Ophthalmology 168
GREEN, A. S., and GREEN, L. D.: Dakin's Dichloramine-T Solution for Ocular Infections 168

Ear

HEITGER, J. D.: Interpretation of Newer Ear Tests 169
BLACK, W. D.: Indications for the Radical Mastoid Operation in Chronic Suppurative Otitis 169
LYON-MERCADO, M.: A Note on the After-Treatment of the Radical Mastoid Operation 169

SURGERY OF THE NOSE, THROAT, AND MOUTH

Nose

BAUM, H. L.: Two Cases of Nasal Pharyngeal Polypus Originating in the Maxillary Sinus..... 170

VEVRASSAT: Nasal Prosthetics by Tibial Bone Graft. 170

Throat

DEAN, L. W., and GREGG, J. B.: An Implantation Cyst of the Larynx..... 170

Mouth

NEW, G. B.: The Use of Heat and Radium in the Treatment of Cancer of the Jaws and Cheeks... 170

SHEARER, W. L.: A Few Principles of Harelip and Cleft Palate Procedure..... 170

BLUM, T.: Mouth Surgery, with Special Reference to Cysts of the Jaws..... 171

CHURCHMAN, J. W.: Fibroma of the Tongue with Consideration of Other Tumors of the Tongue and Certain Technical Points in Tongue Resection..... 171

THOMA, K. H.: The Histological Pathology of Alveolar Abscesses and Diseased Root-Ends 171

BIBLIOGRAPHY

GENERAL SURGERY

SURGICAL TECHNIQUE
- Operative Surgery and Technique..... 172
- Aseptic and Antiseptic Surgery..... 172
- Anæsthetics..... 172
- Surgical Instruments and Apparatus..... 172

SURGERY OF THE HEAD AND NECK
- Head..... 173
- Neck..... 173

SURGERY OF THE CHEST
- Chest Wall and Breast..... 174
- Trachea and Lungs..... 174
- Heart and Vascular System..... 174
- Pharynx and Œsophagus..... 175

SURGERY OF THE ABDOMEN
- Abdominal Wall and Peritoneum..... 175
- Gastro-Intestinal Tract..... 175
- Liver, Pancreas and Spleen..... 176
- Miscellaneous..... 177

SURGERY OF THE EXTREMITIES
- Diseases of Bones, Joints, Muscles, Tendons. General Conditions Commonly Found in the Extremities..... 177
- Fractures and Dislocations..... 177
- Surgery of the Bones, Joints, Etc..... 178
- Orthopedics in General..... 178

SURGERY OF THE SPINAL COLUMN AND CORD..... 178

SURGERY OF THE NERVOUS SYSTEM..... 179

MISCELLANEOUS
- Clinical Entities—Tumors, Ulcers, Abscesses, Etc. 179
- Sera, Vaccines, and Ferments..... 180
- Blood..... 180
- Blood and Lymph Vessels..... 180
- Poisons..... 181
- Roentgenology..... 181
- Hospital, Medicolegal, and Medical Education.. 181
- Military Surgery..... 182

GYNECOLOGY

Uterus..... 182
Adnexal and Periuterine Conditions..... 182
External Genitalia..... 183
Miscellaneous..... 183

OBSTETRICS

Pregnancy and Its Complications..... 183
Labor and Its Complications..... 183
Peurperium and Its Complications..... 184
Miscellaneous..... 184

GENITO-URINARY SURGERY

Kidney and Ureter..... 184
Bladder, Urethra, and Penis..... 185
Genital Organs..... 185
Miscellaneous..... 185

SURGERY OF THE EYE AND EAR

Eye..... 185
Ear..... 185

SURGERY OF THE NOSE, THROAT, AND MOUTH

Nose, Throat, and Mouth..... 186

CONSULTING EDITORIAL STAFF

GENERAL SURGERY—Continued

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AUGUST, 1918

COLLECTIVE REVIEW

WAR INJURIES OF THE FACE AND JAWS

By Major ROBERT H. IVY, M.R.C., Washington, D. C.

THE common occurrence of injuries of the face and jaw-bones during the present war has emphasized the importance of the close association of the surgeon with the dentist in the treatment of these cases, which attract particular attention by reason of the disfigurement which they cause. The special difficulties encountered in their treatment and which differentiated them somewhat from other war injuries arose from the attitude which regarded dentistry and surgery as two distinct and separate professions. The surgeon is not technically trained to splint fractures of the jaw-bones, yet early proper fixation is one of the most important points of the treatment. The dentist as such is not trained to care for the wounded tissue beyond fixation of the bones, yet repair of the soft tissues and proper drainage may be equally important.

EARLY CARE OF FACE AND JAW INJURIES

The earlier literature of these injuries in the present war shows the great ingenuity manifested in devising fixation and corrective appliances for overcoming deformities that were in part due to lack of early treatment. As the means for handling these cases became better organized, attention was directed more to the surgical side of this special problem until at the present time the established principles of surgery and trend of thought of practically all workers lead to the conclusion that a definite plan of treatment for face and jaw injuries should be initiated at the earliest possible moment after the receipt of the injury.

The general organization of the surgical service and technical detail for early treatment of large numbers of wounded is perhaps best described by Duval (21), an ardent advocate of primary suture of wounds. An abstract of Duval's article is found in the *Review of War Surgery and Medicine*, April, 1918, page 15, prepared in the Office of the Surgeon General of the United States Army.

Frison and Brunet (30) call attention to the bad effects of delaying treatment of face and jaw injuries until they reach special centers in the interior. Under these conditions, the wounded arrived at the base with fractures of the jaws that had been left to themselves for weeks, and united in bad position with the formation of cicatricial bands, or even with pseudarthroses of the mandible which threatened to be permanent. It became necessary to undertake long and laborious treatment often with unsatisfactory results, in order to restore these badly deformed faces and to re-establish the physiological movements indispensable for mastication. These authors insist on the utility of centers of maxillo-facial prosthesis in the army zone. The indispensable personnel of such a center is a surgeon, specializing in the surgery of the face and neck, collaborating very closely with dental prosthetists.

Two categories of wounded should in the authors' opinion be kept in the centers of the army zone. In the first are classified those with extensive wounds of the face and neck who are not fit to be moved, those in danger of incurring a quickly fatal hæmorrhage, and those with concomitant severe injuries of other parts of the body. The second class is represented by light

wounds with simple fractures of the jaws accompanied by more or less displacement or loss of substance. Patients so wounded are capable of soon rejoining their regiments, after having been kept in the hospital the shortest possible time. The number of these wounded who can be retained near the front depends largely upon the total number to be taken care of, which is in proportion to the activity of military operations.

Under the proposed plan of early special treatment, the fractures are easily reduced, permitting the placing in the mouth of a fixation appliance with the teeth in normal occlusion. This fixation is followed by a disappearance of the pain previously incurred by the slightest movement of swallowing, speech, coughing, or blowing the nose. The patient is able to feed himself, which was previously almost impossible. This is also the best preventive treatment of immediate hæmorrhage caused by injury to the vessels, or of late hæmorrhage from ulceration of the vessels by sharp edges of bone. In addition, the suppuration and the infection generally present show a very appreciable diminution after the immobilization of the fragments has been brought about. Finally, it is shown that the earlier the prosthetic intervention, the earlier the consolidation in good position. Under these conditions, the wounded will have been absent from their regiments the shortest time possible.

Trotter (89), in advocating systematic operative treatment of gunshot wounds of the mandible, states that attention hitherto has perhaps tended too exclusively to be concentrated on the fixation of the fractured ends of bone. It is clear that when there has been a large loss of bone substance, no amount of fixation can lead to reconstitution of the bone, and that it is toward the latter purpose that all treatment must be directed. If, by fixation, displacement of the fragments can be prevented until reconstitution can be undertaken, so much the better, but the reconstitution must be regarded as the essential purpose and nothing be allowed to prejudice it. The prevention of displacement is certainly less important than the attainment of sound union of the re-formed jaw, and there can be no doubt that if there is any clash of interests between the two objects, a strong and solid bone, even if somewhat deformed, is worth a good deal more than an insecurely united but shapely one. The primary and immediate operation giving full access to the fracture with the purpose of limiting hæmorrhage, sepsis, and necrosis, and attaining a limited and relatively aseptic scar, is an indispensable preliminary to a systematic application of bone surgery to large destructive lesions of the mandible.

Valadier and Whale (90) believe in the early closure of the soft tissues, by flaps if necessary, at the same time preserving the original contour of the bone by means of splints, building out with dental modeling composition, etc. The following principles are formulated: (a) All remaining teeth should be preserved as far as possible, as they may prove useful in providing support for interdental splints. Teeth directly in the line of fracture should be removed, but more conservatism should be observed in regard to the teeth than is usual. (b) In extensive injuries of the face, the wounds should be closed as soon as possible; if necessary, before placing the jaws in position. The wound should be closed long before it is thoroughly clean. Two layers of sutures, one deep and one superficial, are used. Drainage of the mouth should be obtained by a median submaxillary stab wound into which a rubber tube is inserted. Where there has been a loss of tissue in the upper or lower lip, however, it is unwise to draw the edges together. (c) Where the initial closure of the soft parts precedes the orthodontal correction, there is a strong tendency for the soft parts to shrink into cicatrization. This renders work on the jaw itself difficult or impossible; and to prevent it, interdental appliances, to which wire has been attached for the grasping of modeling composition, must be inserted in order to preserve the contour. (d) Superficial sutures must not be subjected to undue tension, even if complete apposition of the wound edges is not obtained.

Nearly all authors agree that it is particularly essential that no loose fragments of bone be removed from the site of the fracture, as in many cases pieces of bone apparently hopelessly injured will recover their vitality and serve as a valuable matrix for repair (Kazanjian, 51).

FRACTURES OF THE LOWER JAW

These are classified according to the seat of the lesion (symphysis, body, ascending ramus, condyloid and coronoid processes), and also according to whether or not there is loss of substance. Two schools of practice may be recognized in the handling of cases with loss of substance: (a) that which considers that consolidation of the fracture should be assured by drawing together the ends of the bone even at the sacrifice of the normal occlusion of the teeth; and (b) a group to which the majority of workers belong, who believe that the re-establishment of the normal occlusion of the teeth is the primary consideration.

The principal supporters of the first plan are Imbert and Réal (49), and Colyer (12). They consider that it is more important to thus avoid unstable fibrous union and pseudarthrosis, necessitating later bone and cartilage grafting, than to have an ideally shaped bone which is unable to bear the stress of mastication. They believe that the shrinkage of the jaw which results from this procedure is of minor importance, even where there has been a loss of continuity amounting to as much as two and one-half or three centimeters. In Bennett's opinion (2), on the other hand the cases in which it is desirable to sacrifice contour and occlusion in order to obtain bony union are comparatively few, and almost limited to a particular class.

It may fairly be said that when normal position has been sacrificed to only a small extent, bony union could usually have been obtained without such sacrifice; and that where by such means bony union is obtained that would otherwise have been unobtainable, then the contraction is so great that the jaw is less useful than would be obtained by firm fibrous union in good position. In cases of unilateral fracture of the region of the angle, however, the approximation of the fractured ends, by allowing the posterior fragment to swing forward, even where there is considerable loss of substance, often materially assists bony union and does not cause loss of occlusion of any moment. Externally there is little visible defect beyond a diminution of prominence of the angle of the jaw. It may be desirable to extract an upper molar to permit of this movement. In fractures anterior to the first molar, this method of treatment involves a shortening of the alveolar arch on the affected side, and it is questionable how far the forward movement should be permitted.

METHODS OF FIXATION

Immobilization of the fragments should be carried out as early as possible in order to avoid fibrous union in false position requiring later corrective measures. Several forms of temporary splints have been devised, to be attached to the teeth by means of modeling composition (Pickerill, 74). When the time comes for the application of permanent fixation, if reduction is resisted by newly formed scar tissue or callus, surgical division of the scar tissue or callus is indicated, followed by immediate fixation of the fragments in correct position. This is preferable to slow reduction by different complicated apparatus requiring weeks or months to bring about results uncertain in the end (Herpin, 41; Cole and Bubb, 11).

A very large number of papers have been written dealing with the classification and special methods of fixation of gunshot fractures of the jaws. That of Herpin (37) is particularly illuminating in regard to the anatomical considerations and their bearing on displacements in fractures of the mandible. Where there is loss of substance at the symphysis, the fragments tend to be drawn together in front with the occlusal surfaces of the teeth facing inward toward each other. In the lateral portion of the bone, the loss of substance causes the large fragment to be drawn over to the affected side. In fracture of the ascending ramus or angle, the ramus is usually drawn upward, inward and forward and the large fragment at its posterior extremity is brought backward and upward. Nearly all authors are agreed that the correct occlusion of the lower teeth with the upper should always be the guide in fixation of the fragments, even though this entails considerable separation between the fractured ends. The form of fixation to be applied depends upon the location of the fracture, the amount of substance lost, the amount of displacement, the number, condition, and position of teeth present. Among the most instructive papers bearing on this question are those of Colyer (12), Frey (28), Hayes (36), Herpin (38, 41, 42), Kazanjian (50, 51), Pont (81), Schroeder (84), Roy and Martinier (82).

The majority of gunshot fractures of the lower jaw involve the body of the bone anterior to the last existing tooth, and are characterized by considerable displacement and loss of substance. The best method of maintaining separation and fixing the fragments in their normal position in relation to the upper teeth in these cases is by the metal band and wire splint, consisting of a stout wire spanning the gap, attached by crowns or bands to sound teeth on either side. These splints can be made either in one solid piece or applied in sections, afterward fastened together (Kazanjian). For fractures behind the last existing tooth, Kazanjian favors treatment by means of a swaged metal splint covering the upper and lower teeth holding the jaws in occlusion, or intermaxillary ligation through the attachments afforded by metal or band and wire splints. In cases where there is a tendency to deviation of the jaw to the affected side and it is desirable to preserve the jaw movement, correct occlusion may be retained by means of inclined planes or interlocking flanges so placed as to guide the jaws into correct position.

Herpin (38) believes that the function of mastication should be retained during the treat-

ment of fractures of the angle or ascending ramus. In these cases he uses a metal bridge fastened to the lower teeth anteriorly with a vulcanite saddle passing back from this embracing the anterior border of the ramus, fixing the latter and preventing it from swinging forward. For fractures of the upper jaw, Kazanjian employs a modified Kingsley bar splint, attached with straps to the vertex of the skull. In cases with much loss or comminution of bone between the palate and the base of the skull, the proper distance of the upper dental arch and the base of the skull is maintained by means of a rigid bar passing from a swaged metallic cap cemented on the upper teeth to a head band. These head bands used in fixation of fractures are also useful as means of attachment for vulcanized rubber pads intended to support the wounded soft parts of the face by making pressure at desired points. Schroeder (84) for fixation of gunshot fractures of the jaws relies principally upon wire arches attached to the teeth by means of clamp bands.

The articles by Hayes (36) consist of a most instructive series of case reports from the American Ambulance in Paris. They are particularly valuable on account of the illustrations. It is notable that practically no reliance is placed on methods of external fixation by any of the authors, and direct fixation of the bones by plating or wiring is almost universally condemned. What he refers to as "postlevator" fractures of the mandible are given special attention by Villain (91, 92). These are fractures situated behind the insertions of the levator muscles, i.e., in the condyloid process, and may or may not involve the mandibular articulation. The only muscle attached to the jaw within the limits of this territory and which therefore does not act on the larger fragment is the external pterygoid.

The clinical signs of these fractures are more or less accentuated according to the extent of the lesion and the loss of substance; they include: pain in the temporomaxillary region on digital pressure and during mandibular movements, especially during closure of the mouth; inability to protrude the jaw, distolateral displacement, tendency to vertical displacement, and oblique opening of the mouth toward the fractured side. Crepitus can only be detected in thin subjects by direct contact of the finger on the fracture, and when there is no loss of substance. There is very little swelling and induration of the skin if the fracture is closed or not infected; otherwise œdema and induration of the temporomaxillary region are present. Trismus is established early and soon may develop into a stubborn contraction. Villain discusses at length the pathologic physiology of these cases with special reference to muscular action.

This action may be summed up as follows: The small fragment is drawn by the external pterygoid muscle forward, inward and downward, while the injured end of the large fragment is drawn backward, outward and upward. The treatment of the postlevator fractures is distinguished from that of other mandibular fractures by the fact that the posterior fragment cannot be held by fixation apparatus. The usual methods of leaving the work of repair entirely to nature or fixing the lower to the upper jaw are condemned. Villain's methods have for their object not only the maintenance of the large fragment in normal occlusion but also the preservation of its fractured surface in contact or in correct relation to that of the small fragment. He uses a splint attached to the upper and lower posterior teeth having a crank-like action and having a point of support which replaces the nonfunctioning joint. This apparatus varies somewhat with the direction of the fracture and the loss of substance.

Kazanjian (52) reports special methods of fixation to which he resorts in certain severe cases with marked comminution and displacement of small fragments. His observations are as follows. In certain cases, where the destruction covers an extensive area, difficulties of reduction and fixation present themselves, as in the following:

1. Extensive crushing of the jaw with laceration of the soft tissues and distant displacement of splinters, the teeth being lost either from the injury or previously.

2. The same condition with preservation of a few teeth markedly displaced.

3. Horizontal fractures associated with vertical fractures.

4. Extensive crushing of the anterior portion of the jaw, with such displacement of the fragments that consolidation is problematical although the quantity of bony tissue saved may be theoretically sufficient to permit it.

The displacement of the fragments is proportionate to the destruction of the equilibrium of the muscles which move the jaw. The greater the injury, the more pronounced the displacement upward of the posterior parts and downward of the anterior fragments. For consolidation to occur, it is indispensable that all of the fragments be replaced in good position and fixed there. The loss or absence of teeth is a serious obstacle, for it is clear that the small bone fragments themselves cannot be of great help in this fixation.

From the standpoint of treatment, the cases may be considered as follows:

1. Cases in which the crushed portion corresponds to the incisors, canines and premolars; displacement downward; the molars can be used for fixation of the splinters. A German silver arch, in the form of a bow, is fitted and cemented to the teeth in such a way that the two posterior segments are solidly maintained in perfect occlusion. This arch follows the curve of the bone at the height of the middle of the teeth. In its center is placed a T-shaped support, for the purpose of fixing a vulcanite piece which serves as a filling for the soft parts. Suture wires hold up against this arch the bony fragments at their normal height, reestablishing their normal points of contact. In the same way, in the case of a horizontal fracture, the inferior segment is made to approach the preserved segment.

2. Similar cases, with absence of teeth on one side. Bands of metal are fitted to the existing teeth, prolonged as far as the premolar region of the opposite side. They are cemented to the teeth and the suture wires placed as in the first case. If the lack of teeth has done away with the normal occlusion, a vulcanite piece is made for the upper jaw which keeps the fragment down in correct position. An extrabuccal piece may act as an adjuvant to immobilization, consisting of a plate of vulcanite fitted on the forehead and temporal regions, bound to the maxillary arch with a rigid wire.

3. Cases in which the fracture reaches from one angle to the other, with extensive crushing, displacement and absence of teeth. These cases require the same immobilization as in the first two types, but with slight modifications. Larger silver wires are fixed to the ends of the rami. An arch is fixed to them, upon which the bony fragments are suspended as heretofore. The upper teeth, when present, may serve for sustaining the apparatus; if not, recourse is had to an external appliance.

TECHNIQUE OF SUTURING THE FRAGMENTS

This is done as soon as possible after receipt of the wound, preferably within the first few days. All the sutures are placed from within the mouth, and not through the cutaneous tissues. At the first stage of the operation, the fragments are denuded to allow the passage of the wires. Local anæsthesia is preferred if possible, as it is less dangerous than general anæsthesia, which exposes the patient to the complications of bronchopneumonia and renders the work of the operator more difficult.

Absolute alignment is not always possible; the essential is to obtain contact with reduction of the displacement. The suture wire should not be removed for three or four weeks, a delay necessary for beginning consolidation. At this time, a chin cup may be employed as adjuvant, which would not have been possible at the first. The apparatus employed should give upward and forward pressure to counterbalance the action of the depressors. When cicatricial adhesion of the tissues tends to occur, a prosthetic piece is indicated.

This method is only applicable in cases where there are extensive fractures of the jaw, lesions of the soft tissues, and total or partial absence of the teeth. There is no need to have recourse to it in cases less grave. Even when complete consolidation is not obtained, the improvements which result justify the measure, for:

1. The power of regeneration of the bone is very great and experience has shown that the probabilities of union are good when the fragments are replaced in good position and in contact.

2. Even if union does not follow, future grafting operations are facilitated.

3. By the rapid fixation of the fragments, the facial contour is notably preserved.

4. Future autoplastic operations are likewise facilitated.

COMPLICATIONS OF GUNSHOT WOUNDS OF THE FACE AND JAWS

Hæmorrhage. Valadier and Whale (90) state that a slight secondary oozing following these injuries is fairly common. Out of 1,010 cases, it was necessary to tie an artery in its continuity through a fresh incision in only eleven. In severe bleeding their routine practice is to tie at once the external carotid artery just above the origin of the superior thyroid. Kazanjian and Burrows (53) give the following figures based upon 400 cases of gunshot wounds of the face with fracture of the jaws; 34 mild and serious hæmorrhages occurred, or 8.5 per cent. Sixteen of these required operative measures for controlling the bleeding under a general anæsthetic, while the remaining seventeen were controlled by packing, clamping, or by the use of a local anæsthetic for ligation of the bleeding point. One case died suddenly from very profuse hæmorrhage. The majority of secondary hæmorrhages took place between the fourth and the twelfth days after injury; one occurred on the forty-fourth day.

It is not always possible to determine the artery which is responsible. Injuries to the inferior

maxilla are often accompanied by nasal bleeding from the deeper structures, which arises probably from the branches of the internal maxillary artery. Among ninety-one cases of fracture of the upper jaw, there were four hæmorrhages; in three of these hæmorrhage was easily controlled by packing, while in the remaining one it was persistent and recurrent. Hæmorrhage from the main trunk of the internal maxillary artery is rarely or never met with. In those cases where the wounds are below or behind the angle of the lower jaw and involve the pharyngeal cavity and the neck, it is difficult to decide by internal examination which side is responsible for the bleeding. Bleeding which occurs as the result of an extensive wound of the molar and bicuspid region of the lower jaw and accompanying injury of the floor of the mouth usually arises from the lingual artery or its branches. Such cases have been most common, seventeen out of thirty-four.

Certain cases which presage hæmorrhage from the lingual artery have recognizable characteristics. The wounds of entrance and exit are usually small, and situated in the vicinity of the posterior half of the lower jaw. The tongue is perforated, often dark purple in color, and swollen to twice or three times its normal size, so that the mouth is held open and the tongue protrudes beyond the lips. The jaw is fractured bilaterally and the anterior segment shows a pronounced downward displacement. On the other hand, large wounds anterior to the bicuspid region are unlikely to presage serious hæmorrhage, since the area affected is supplied only by smaller vessels. Extensive injuries, with destruction of the hard or soft tissues, but which are open, are less prone to bleed, because the free drainage forestalls the spread of sepsis. In the majority of cases of profuse intrabuccal hæmorrhage from the floor of the mouth, ligation of the bleeding point is impracticable, and the injured artery must be secured at some point proximal to the seat of trauma. The chief difficulty here is to recognize which artery is responsible. It is often impossible to determine from which side the hæmorrhage comes.

Broadly speaking, (a) bleeding from the floor of the mouth comes from one or both lingual arteries or their branches; (b) bleeding from between the fragments of a broken lower jaw arises from the inferior dental; (c) bleeding from the cheek or lip has its origin in a branch of the facial; (d) bleeding from the pharyngeal and tonsillar regions will call for ligation of the external carotid artery.

The fracture and comminution of the jaw-bone and swelling of the tongue and soft tissues increase the difficulty of approximate localization of the bleeding point. To avoid these difficulties, the authors adopted the course of ligating the external carotid in all doubtful cases, but before long they reverted to the former practice of ligating, if possible, the individual artery involved. Ligation of the external carotid in these cases of extensive injury to the jaw, face and neck is attended by considerable difficulty and danger. Moreover, profuse recurrent hæmorrhage from the floor of the mouth nearly always arises from one or both lingual arteries or their branches. The procedure therefore in all copious hæmorrhages from this latter area, occurring in connection with gunshot wounds, is to ligate one or both lingual arteries, provided the anatomical conditions are compatible with a wound of these vessels.

To assume that the lingual is the source and to act on this assumption may seem on first thought to be unsound. However, improved results and lowered mortality more than justify the practice.

TABLE OF COMPARATIVE RESULTS

Artery Ligated	No. of Cases	Deaths	Mortality per cent
External carotid	10	5	50
Lingual	6	1	16.6

Ligation of the lingual artery should be done in its first or second portions, through a neck incision. If ligation of the external carotid becomes necessary, this should be tied high, so as to avoid thrombosis and embolism in the common carotid. Of the thirty-four cases of secondary hæmorrhage, seven died.

Pneumonia. Kazanjian (51) states that one-fifth of the patients with fractured jaws develop bronchitis or bronchopneumonia, due to the septic condition of the mouth. Infections of the respiratory tract are often induced in these septic mouth cases by the use of general anæsthesia in operations for concomitant wounds of other parts of the body. The mouth should always be cleaned and irrigated before giving a general anæsthetic. The use of morphine should be avoided when possible, as it may paralyze the laryngeal reflex and facilitate aspiration of septic matter from the mouth. Pre-anæsthetic medication should be limited to atropine. These patients should be kept in a sitting position as much as possible. Valadier (90) comments on the comparative rarity of lung complications in face and jaw injuries, in view of the septic condition of the mouth. Only one rib resection for empyema has had to be made in his service. For two years he

cleaned all jaw injuries with simple boiled water, avoiding antiseptics as much as possible.

Grave local and general sepsis. In 1,010 cases of jaw and facial injuries observed by Valadier (90) there were 27 deaths; of these 7 were beyond saving on their arrival. One case died of streptococcal septicæmia, one of septic meningitis, and one of general pyæmia. Two patients died of l[illegible]liastinitis which spread from a retropharyng[illegible]al abscess in the track of the missile.

Trismus or constriction. According to Imbert and Réal (47) trismus seldom or never follows gross traumatisms. It only succeeds small wounds whose healing has been rapid and which have not seriously altered the skeleton of the face. These authors have never seen true ankylosis of the mandibular joint after a wound. Only 10 to 20 per cent of cases of constriction of the jaws are due to cicatrices. Four-fifths belong to a form quite different and generally easily curable. This is characterized by the fact that it appears immediately after receipt of the wound, that it follows an insignificant lesion, and that opening of the mouth is easily brought about. The lesion is probably a simple contracture of the muscles of mastication (myotonia).

Treatment consists in spreading the jaws apart by a mouth opener with two divergent branches. This is introduced closed between the teeth and opened with a moderate but sustained pressure. During the opening the patient is made to talk, if possible, by asking him questions. Ordinarily, the operation is not painful. After the first treatment, there are two daily seances of half an hour each with the automatic mouth opener. Between treatments the mouth is kept open with wood blocks between the teeth, and cure should be obtained in two or three weeks. Herpin (40) has devised a simple wooden appliance, somewhat resembling a glove-stretcher, for the treatment of these cases. Colyer (12) and Huguet (44) describe more elaborate apparatus to ensure equal distribution of force. Valadier (90) employs plain wooden wedges.

Matti (57) groups cases of jaw closure following war injury into four categories as follows:

1. Injuries of the mandibular joint with bony ankylosis. These cases are to be treated by resection of the joint.

2. Wounds of the region of the coronoid process and temporal muscle. Bony union between the coronoid process and the zygoma or base of the skull. Operative treatment.

3. Chronic inflammatory alterations with considerable shrinkage in the region of the masseter or of the pterygoid muscles as a result of long-standing suppuration. Slight cases are treated by stretching under anæsthetic and long-continued after-treatment with screw gags. Operative treatment for severe cases.

4. Pertinacious and high grade contraction of the muscles of mastication caused by chronic irritation arising from a punctured wound of the region (probably the same type of cases referred to by Imbert and Réal as myotonia). Treatment by forcible stretching under anæsthetic, and after-treatment with screw gags.

DIET

Pont (81) in patients wearing splints which lock the jaws together recommends the following daily diet: 3 liters of milk; 4 eggs; 1 liter of bouillon; 100 grams of meat juice; 1 liter of wine.

The patients are weighed every four days and in nearly all cases the weight is maintained and even augmented sometimes.

Colyer (12) gives the following graduated diet in face and jaw injuries: (a) fluids: milk, beef tea, chicken broth, supplemented by extras; (b) minced: minced chicken, minced ordinary diet, supplemented by minced fish, eggs, and semifluid pudding; (c) boiled ordinary diet, supplemented by fish, eggs, suet puddings, and toast; (d) ordinary regulation diet.

Kazanjian (51) gives liquid food either through a porcelain feeder or through a funnel and rubber tube which can be carried far back in the mouth. His summary of dietary is as follows: (a) For acute injury of the jaw, liquid, every two hours during the day, and every four hours during the night. Milk, one pint, one egg, or strong soup or Benger's food with an egg, or Bovril made with milk, or thin arrowroot with Valentine's meat juice, or boiled custard with the addition of stimulants, brandy or port wine as ordered. In twenty-four hours there would be required four pints of milk; four eggs; two pints of soup. (b) Semi-liquid dietary for convalescent patients, same as above in four-hourly feeds. In addition, baked custard, strained fruit juice or stewed fruit, jelly, Benger's food, bread and milk, porridge. (c) Semi-solid dietary for convalescent patients, for breakfast (7:45 a.m.) porridge, one pint, milk, one pint, sugar, tea, thin bread and butter. Alternative, bread and milk or gruel. For lunch (11:00 a.m.) bread and milk or beef tea with bread. For dinner (1:00 p.m.) minced meat, mashed potatoes, greens, milk pudding. For tea (4:00 p.m.) tea or bread and milk; two eggs lightly boiled, poached, fried, or scrambled; bread and butter. For supper (7:00 p.m.) cocoa, one pint, or bread and milk.

PSEUDARTHROSIS

According to Imbert and Réal (48), surgical treatment of pseudarthrosis comprises two principal methods. The first is applicable to fractures with loss of substance equal to the width of two molars (3 cm.) at most, simple osteosynthesis. The other can be employed where the loss is greater, namely, bone grafting. In performing osteosynthesis, the authors, under chloroform anæsthesia, expose the involved area through a curved incision, dissect out the fractured ends of the bone, excising fibrous tissue, and squaring and freshening the ends by means of a burr in the electric engine. The fragments are brought into close contact and held in place by a metallic plate fixed by screws. The screws should avoid the sockets of the teeth and the plate be placed as near as possible to the lower border of the jaw. The upper and lower teeth are fixed in occlusion with brass ligatures and maintained thus for two months at least.

The indications, technique, and results of bone or cartilage transplantation in pseudarthrosis after gunshot fractures of the lower jaw have been given the close attention of many workers. Free tibial grafts receive consideration by McWilliams (59), Du Bouchet (19), Pont (81), and others. Direct free rib grafts are favored by Gallie and Robertson (32), and indirect rib transplantation is described by Imbert and Réal (46). Cavalié (8) prefers a pedicled graft taken from the jaw itself. The chief exponent of cartilaginous transplants is Morestin, whose principal articles are referred to (64, 65, 66). The more important points in these articles will now be discussed.

Bone grafts are indicated according to practically all authors, only in old cases of pseudarthrosis. Aside from cases with great loss of substance, the bone-grafting operation should always have been preceded by a prolonged treatment by prosthetic fixation whose inefficacity should have been well demonstrated. The essential requirements emphasized by practically everyone for successful grafting are as follows: (a) Operation should be performed only in the absence of any inflammatory or pathological condition in the region. (b) Communication of the mouth cavity with the wound must be avoided. (c) It is indispensable that as perfect immobilization as possible be assured by apparatus fixing the lower teeth to the upper.

Gallie and Robertson (32) draw attention to the principles that should govern bone grafting. The so-called living autogenous bone graft is alive only by virtue of the osteoblasts that are free on its surfaces and in the mouths of the haversian canals. All the rest of the graft dies and is absorbed. It owes its value in bridging gaps and in encouraging union of ununited fragments to the fact that during the process of its absorption, the osteoblasts which invaded it from its own surface and from the neighboring bones build up new bone to take the place of that which is absorbed, so that ultimately the break in the continuity of the injured bone is bridged by new and healthy bone. This fact indicates the necessity for perfect contact of the graft to fresh and healthy bone in the fragments; it also shows the importance of using as a graft bone from which the periosteal and endosteal surfaces have not been removed, as it is on these surfaces that the greatest number of osteoblasts are to be found. For the same reason the graft should be made from bone which is as porous as the requirements of the case in relation to strength will allow; hence the value of the rib as a graft, particularly if it has been opened up so that the osteoblasts of the interior can obtain the necessary lymph.

In bridging gaps for fracture of the mandible, the following technique is used: The fragments are exposed by a long incision along the lower border of the jaw. The motor saw is then applied to the fragments, and a saw cut made along the inferior border extending an inch to an inch and a half back from the end of the fragment and about half an inch deep. Great care must be taken to avoid opening into the cavity of the mouth or into the sockets of the teeth. An osteotome is then driven into the saw cut, and a greenstick fracture produced, widening the wedge-shaped gap for the reception of the graft. An interdental splint which has previously been cemented to the teeth of both jaws is now locked, with the teeth of the two jaws in exactly the correct relation to one another.

The graft is made by resecting three inches of the rib. This piece of rib is then split on the flat, in order that the endosteal surface may be bathed in lymph. Half of the graft is then driven into the slots in the fragments, the smooth side of the rib facing toward the mouth cavity. This leaves the rough, cancellous surface of the graft facing outward and sunk somewhat below the outer surface of the jaw. This depressed area is then filled out by laying a piece of the other half of the rib in the gap, with the smooth side out. The fragments and grafts are now fastened solidly in place with kangaroo tendon passed through drill-holes. This adds additional security although it is really unnecessary, as the principal graft is self-retaining, being wedged solidly into the saw cuts in the fragments.

The operations on the jaws have been most satisfactory. Several soldiers have been operated upon by this technique who have been able to eat ordinary food five months after the implantation of a graft which has bridged gaps of from one to two inches.

Du Bouchet (19) finds that most of the methods of bone grafting in respect to the lower jaw are complicated and uncertain in their results. He describes a technique for which he claims ease and rapidity, necessity for no special instruments, assurance of broad surfaces of bony contact, simple and efficient fixation of the graft, and utilization of the osteogenetic power of the neighboring periosteum. The site of pseudarthrosis is exposed by an appropriate incision, utilizing if possible the line of an old scar. Without touching the pseudarthrosis, the periosteum of the two fragments is incised and then with the elevator a pocket is very easily formed between the bone and the periosteum. The dimensions to be given to the graft are then measured so that the latter will bridge the pseudarthrosis and exceed it by two centimeters at each end. Nothing is more convenient for this purpose than the common carpenter's compass, with set screw. After very careful hæmostasis, the osteoperiosteal pockets are packed, and attention is turned to making the graft. This is removed from the inner surface of the tibia with a thin Macewen osteotome and mallet, and comprises the periosteum and the compact bony tissue. Its dimensions are arrived at by measurement with the compass, and are usually about 6 to 8 cm. long and 1½ cm. wide. The graft is seized directly in a small forceps and carried to its osteoperiosteal bed, sliding readily into the two pockets. Nothing remains but to suture the two wounds.

A very conservative estimate of the value of bone grafting is given by Imbert and Réal (46). These authors consider that altogether too much has been claimed for the procedure. When the lost bone amounts to less than 3 cm., the graft should be successful in exciting osteogenesis in the fractured ends, taking no part however in callus formation. When the breach amounts to over 3 cm., the results are uncertain, and it is not thought that the graft of itself can reconstitute the continuity and, above all, the solidity of the bone. Nevertheless, the results obtained are not negligible, since for an absolutely floating pseudarthrosis is substituted a double but close false union.

In order to reduce the danger of infection to a minimum the operation should be performed in two stages. The first operation consists in the removal of the piece of bone to be transplanted, the rib being used exclusively, and its burial under the skin of the region where it is to be later fixed. The rib segment is placed in the soft tissues with its concave surface forward. At the end of a month, the graft is loosened in its bed, without disturbing the new vascular attachments, turned so that the convex surface faces outward, and fixed to the ends of the fractured bone by the usual methods of screws or ligatures.

Cavalié's method (8) consists of an autograft taken from the jaw itself where the graft presents the same biologic qualities as the fractured fragments. If the bony breach is less than 2 or 3 cm., it suffices generally to have only one graft which can be cut long enough from one fragment. If the bony gap is over 2 or 3 cm. wide, it may be necessary to cut the graft from each fragment and to unite them in the middle of the breach.

The graft is detached by cutting with shears the lower bridge of union with the inner table. Then this is separated with a flat narrow chisel passed into the spongy tissue, and the end of the graft away from the fracture is detached with the chisel. The graft is then slid across the breach until the end enters between the two tables into the spongy tissue of the opposite fragment, while its other end rests in contact, by its deep spongy surface, with the substance of the fragment of origin. It is sometimes possible to leave the graft some periosteal adherence to the fragment of origin. In other cases, the graft is turned over toward the opposite fragment after the manner of a hinge. The graft is fixed with catgut sutures.

Morestin (64, 66) is the principal exponent of the use of cartilage transplants for the repair of defects in the jaws. He employes the cartilage of the sixth, seventh and eighth ribs. The advantages he claims for cartilage over bone as a transplant are many. Resection of costal cartilage, if performed properly, never gives rise to untoward consequences. The cartilage can be easily cut with a knife into the exact shape desired, and without the need for special instruments. The transplanted fragments readily adapt themselves to their new location, and are rarely thrown off or re-absorbed.

Absolute rigidity of the jaw does not result from cartilage grafting. There is never actual union between the cartilaginous and the bony tissue. All that can be hoped for is a filling in of the gap, the placing of an obstacle in the way of reproduction of vicious position, and very often there exists a very close pseudarthrosis between the extremities of the bone and the cartilaginous piece. In the latter case, the persistence of a

slight, obscure mobility does not cause noteworthy interference with the function of the jaw. Morestin performs the first part of the operation, i.e., removal of the cartilaginous piece, under chloroform anæsthesia. The facial stage is accomplished entirely under local anæsthesia. Thus most of the dangers of infection by saliva are done away with, one is not hampered by the anæsthetist, and the maneuvers are more conveniently carried out with the patient conscious.

Morestin employs costal cartilage for reconstruction of other bones than the lower jaw, viz., the malar bone (62), the upper jaw (63), etc. Sebileau (85), in discussing Morestin's methods, says that the objects of treatment in gunshot fractures of the lower jaw are (a) cosmetic, (b) functional, as exemplified in restoration of the correct occlusion of the teeth, and (c) restoration of the continuity of the bone. The cosmetic results of cartilage transplantation cannot be denied. As to the restoration of dental occlusion, he does not consider that this has been achieved in any of Morestin's cases; nor is the continuity of the jaw-bone re-established sufficiently to permit the mastication of solid food. From the functional standpoint, therefore, he does not regard cartilage transplantation in these cases as a successful procedure.

PLASTIC SURGERY OF THE SOFT TISSUES

The secondary repair of war injuries of the soft tissues of the face is brought about by employment of various well-known methods used in civil practice, viz., by free Wolff and Thiersch grafts, by sliding flaps from neighboring parts, by pedicled flaps from nearby or from distant parts such as the neck, chest, and arm. The best notion of the application of these methods to war injuries is gained by a study of the illustrated reports of individual cases, as each case is different in some respects from every other case. The articles of Cole (10), Esser (24, 25), Gilles (33), von Hacker (35), Horsley (43), Moure (70), Morestin (60, 61), Piétri (77), Pont (78, 79), Valadier and Whale (90) are replete with interesting cases. Most of the authors point out the value of immediate replacement after the injury of the lacerated tissues into their approximately correct position, thus enormously facilitating later corrective measures.

Secondary plastic operations should not be performed too early when infection is still present in the scar tissue. According to Whale (90), pedicles of transplanted flaps can rarely be divided safely after ten or fourteen days, as often stated; three weeks is as a rule a minimum. The margin allowed for shrinkage of flaps is commonly given as one-sixth of the area, but in Whale's experience one-third is more accurate, i.e., a piece of soft tissue should be cut one-third larger than it is ultimately intended to be.

Esser (24) prefers to cover defects of the face with tissue from the immediate neighborhood, avoiding, if possible, the use of pedicle flaps from a distance. In this way the skin of the area covered closely resembles that of the rest of the face. In almost every instance, even with very large defects, this principle can be carried out. The one point necessary is that the parts be made sufficiently movable, either by cutting on one side, half pedicled, or when necessary with entire pedicles. A new technique for Thiersch grafts is described by Esser (25), viz., the epidermic inlay in combination with dental modeling composition. The bad results of Thiersch skin grafting are largely due to irregular healing of the skin and the grafts, with the formation of scars. Esser, in seeking a means for applying the Thiersch evenly and maintaining it immovable under equal pressure on the wound for several days, conceived the idea of stretching the skin graft on an impression of the wound made in dental modeling composition, inserting this in the hollow of the wound, and suturing the edges of the wound over it.

The types of cases in which this method is serviceable are: (a) enlargement of the conjunctival sac; (b) construction of a part or of the entire ear; (c) enlargement of mucous membrane of the mouth; (d) enlargement of the mouth cavity; (e) defect of the hard and soft palate; (f) covering of various forms of skin flaps.

Cole (10) emphasizes that the principles and plan of treatment of face and jaw injuries should from the very first be evolved by the combined efforts and pooled knowledge of the surgeon and the dental surgeon concerned. In the majority of cases a wound of the cheek involving the mucous membrane is complicated by fracture more or less extensive of the lower or upper jaw. From the viewpoint of function the bony lesion is of more importance than the injury to the soft tissues, and its efficient treatment should consequently hold first place. If this be neglected and the soft tissues closed early, the functional outlook may be hopeless, owing to the patient's mouth being fixed in a closed position by the contracting scar, demanding a secondary operation which leaves the patient in the same condition as when wounded. Cole is convinced that primary suture of such wounds should never be undertaken when complicated by an associated

fracture unless the fracture can be dealt with at the same time.

In the majority of cases, therefore, it becomes necessary before operating on the soft tissues to wait until all sepsis has disappeared and the wound has soundly healed. The waiting time can be utilized for controlling and limiting contraction of the scar tissue as far as possible. In the case of a cicatrizing wound threatening the movements of any particular joint, it is the surgeon's endeavor to maintain the joint in that position which will most effectually conserve the movement whose limitation is threatened. The movement limited or rendered impossible here will be that of opening the mouth. It is necessary therefore to apply a splint to hold the jaws in the position of open bite. In association with the open bite splint the author is accustomed to using a smooth adjustable shield in the mouth which prevents prolapse of the lips of the wound, maintains contour, and preserves the buccal sulcus. For repairing these defects involving the mucous membrane of the cheek it is advisable to employ doubly epithelialized pedicled flaps from the neck or scalp, direct borrowing usually being unsatisfactory. In using scalp flaps for non-hairy parts, depilation may be carried out with the X-ray.

FACIAL PARALYSIS

Morestin (67) describes a case of facial paralysis due to gunshot injury, which he treated by muscle anastomosis. Two operations were performed under local anæsthesia. At the first operation, a slightly curved incision was made following the anterior boundary of the temporal fossa, descending to the malar bone, about 7 cm. in length. A bundle of fibers was detached from the anterior part of the temporal muscle, left continuous below with the main portion. The fibers of the orbicularis palpebrarum were then sought beneath the skin of the lower eyelid and the bundle of muscle fibers from the temporal was inserted beneath them, being fixed with a few buried sutures of fine catgut. Before placing and tying the threads, the most favorable points for correcting the vicious attitude of the eyelid were selected by making traction with forceps and the result noted. The cutaneous wound was closed without drainage.

At the second operation, an incision 5 cm. long was made under the angle of the jaw, the anterior border and part of the external surface of the masseter being exposed. The buccinator was then sought and drawn back and fixed by a series of buried sutures to the anterior border, to the aponeurosis, and to the superficial fibers of the masseter, the points of suture being guided by the effects of traction at certain points.

These operations, while far from bringing about restoration of function, at the same time cause to a large extent the disappearance of the asymmetry of the face when the muscles are at rest; when the muscles are in action, the asymmetry increases, but is not nearly so marked as previously. The patient cannot completely close the right eye, but by comparison with the previous condition, a great improvement is seen, the eyeball being better protected, the lacrymation having ceased, and the conjunctival irritation having disappeared. This method, particularly in cases of gunshot wound where the search for ends of the nerve would be fruitless, can therefore render valuable service as a palliative measure.

SALIVARY FISTULÆ

Salivary fistulæ resulting from war wounds practically always are connected with the parotid gland and its duct, injuries in the submaxillary region rarely being followed by salivary fistulæ.

All the authors divide these fistulæ into two forms: (a) glandular fistulæ; (b) fistulæ of Steno's duct. An idea of the relative frequency of these two forms may be gained by noting Morestin's figures (68). Since the beginning of 1915, this surgeon has treated 62 salivary fistulæ, 30 being glandular and 32 involving Steno's duct.

Parotid glandular fistulæ. According to Dieulafé (15), clean incised wounds involving the parotid gland usually heal spontaneously. The destructive wounds caused by modern war projectiles, always complicated by infection which involves the individual lobules and acini of the gland, frequently lead to fistulæ.

Symptoms. The fact that a fistula exists may be hidden for some time, being masked by the inflammatory phenomena which give rise to suppuration. In these cases the fistulæ are preceded by a slowly progressive salivary tumor, varying in volume from day to day. After recession of the inflammatory phenomena, there is observed at a place on the surface of the masseter or in the sternomaxillary space a small reddish point, flattened or acuminated, at the site of which is established a flow of thin, clear liquid, limited to a few drops when the jaws are at rest, becoming abundant and at times excessive during the movements of mastication. The diagnosis can only be in doubt in cases where a very small fistula exists or where suppuration of the parotid wound is still very marked; in these cases, if observation of the production of secretion is not sufficient to establish the diagnosis, the function-

ing of the gland is provoked by touching the lingual mucosa with a drop of vinegar or by making the patient masticate a small piece of hard bread; there will then be seen streaming abundantly from the fistulous point in veritable jets a clear, thin fluid. The patient himself may make the diagnosis by noticing a marked increase in the flow of liquid at meal times, and may be literally inundated by the saliva which runs down his cheek to his clothing.

The fistulous openings may be multiple, but those generally observed are single. The site of the lesion varies, all of the region occupied by the parotid being subject to traumatism or suppurative complications by extension from the original wound. Spontaneous closure of glandular fistulæ sometimes occurs, but not so frequently after war injuries as after those seen in civil practice.

According to Piétri (76), the location and direction of the wound in relation to the intraglandular ducts have an important bearing on the gravity of the case. The principal intraparotid collecting duct emerges from the anterior border of the gland at the junction of its upper and middle thirds. Anatomical considerations show that a wound situated farther from the median collecting duct will involve a rather large number of collateral branches, while a wound of the upper or lower portion of the gland will involve, especially if superficial, only small unimportant branches. Spontaneous healing often occurs in these latter cases.

If the wound is parallel to the principal parotid duct and situated very close to it, the lesion will involve, near to their point of junction with the main collecting channel, all the collateral branches coming from the portion of gland above or below the lesion, resulting in an obstinate salivary fistula. In a vertical wound of the parotid, the median duct may or may not be involved. If the median duct is spared, the collateral branches involved will often be unimportant, and in any case will be few in number so that the external flow of saliva will be relatively slight, and healing of the wound easily accomplished. If, on the contrary, the vertical lesion involves the central duct of the gland, the flow of saliva from the wound may be very abundant. All of the saliva carried by the collateral branches mesial to the section will flow out by the wound. Furthermore, since the presence of valves regulating the flow of saliva in the excretory canal has not been demonstrated, a portion of the saliva emptying by collateral branches distal to the section may be discharged through the wound instead of into the mouth.

Surgical intervention in a case of this kind, in order to have some chance of success, must aim not only to direct into the mouth the flow of saliva discharged into the duct behind the solution of continuity, but also to prevent at the same time the discharge through the wound of saliva entering the anterior portion of the canal. The second part of this problem seems easily achieved, but the first, on the other hand, may appear impossible, owing to continuous secretion from the posterior part of the gland interfering with cicatrization of the wound.

Treatment. The multiplicity of procedures proposed proves that no one of them can be used exclusively for all cases. Dieulafé discusses most of the methods of treatment that have been employed, such as compression, excision of the fistulous region followed by suture, oily injections, etc. He briefly dismisses immobilization of the jaws as a method of treatment *per se* with the remark that many cases will heal spontaneously when the jaw is free and mobile, and that persistence of the fistula is found just as often among patients who have had the mouth closed during a long period as among those who have all the time preserved their masticatory movements.

Piétri, on the other hand, believes that the simple procedure of immobilization of the jaws should be tried first in all cases before resorting to operation, claiming that it is logical to favor healing by diminishing the production of saliva through the suppression of the function of mastication and reducing gustatory sensation. He uses a skull cap of woven material which prevents the mouth from being opened. In certain cases it is advisable to combine this with intermaxillary ligation or splinting of the teeth. The patient is given liquid diet for several weeks, and abstinence from speech as far as possible is enjoined. As the fistula is seen to close, in the return to normal, the diet is increased by gradual stages. It is not known what becomes of the parotid gland in the course of this treatment, but it probably enters simply into a state of rest, and then, with mastication, if the excretory duct is permeable, it takes up again its normal function. It cannot be claimed that this method of immobilization of the jaws is infallible; however, it is so simple, and the results obtained are so encouraging, that it is always worthy of trial. Piétri's observations are based on 38 cured cases.

Cauterization. Dieulafé recommends cauterization with silver nitrate for small fistulæ draining slightly and limited to small groups of acini. Cauterization with a fine thermocautery point has also given him good results. The accessible

portions of the parenchyma are reached directly through the fistulous tract by application of the cautery two or three times at three or four days' interval. This may be insufficient and at the same time the lesions may be too insignificant to justify an operation. In these cases Dieulafé makes an incision above and below the fistula (always in the direction of the fibers of the facial nerve) and through this little opening he touches with the cautery all of the exposed surface; he then curettes or excises the cutaneous tract and reunites the skin with horsehair or silk threads. One of the foregoing methods is indicated particularly for small fistulæ following intraglandular suppuration.

Creation of an artificial opening into the mouth. In cases of fistula involving portions of the parotid parenchyma which is spread over the surface of the masseter and near the anterior border of this muscle, Dieulafé imitates the procedure which he applies to fistulæ of Steno's duct when this duct is injured at its posterior extremity or when it is grasped very tightly in scar tissue. A tunneled sound with a blunt end is introduced into the cutaneous orifice and thrust gently through the tract. The skin is sectioned in a linear direction anteriorly and posteriorly to the sound, and the end of the sound must not be displaced and must always remain in contact with the bottom of the fistula, this being the point where the junction of the abnormally open acini or canalaculi occurs and serving as the landmark for transfixion. Without losing contact, the sound is directed obliquely forward toward the mucous membrane of the cheek and perforates through the injured parenchyma; with a narrow bistoury and guided by the sound, all the tissues are opened which separate the gland from the buccal cavity, the incision passing over the anterior border of the masseter, for if this muscle were transfixed, the new tract would be quickly closed by muscular contractions. A very oblique tract is thus made through the gland, the aponeurosis of the cheek, the fatty pad of Bichat, and the mucous membrane. The tissues in front of the masseter are drawn forward in order to avoid cutting the facial vessels. A rubber drain is introduced into the tract, 6 or 8 mm. long, by means of a forceps passed from the mouth through the orifice made in the mucous membrane; the forceps is pushed as far as the cutaneous opening, the drain grasped and drawn toward the mouth, and secured by a thread attached to the neck of a tooth. On the skin side the drain is cut even with the parenchyma of the gland, and the cutaneous incision sutured over it after excision of the fistulous tract. The drain is left in place as long as possible, ten, twelve or fifteen days, in order to ensure the production of a well-formed false duct.

Resection of the auriculotemporal nerve. Deupès (14) and Dieulafé each call attention to the rationality of diminishing the secretory function in fistula of the parotid gland by resection of the auriculotemporal nerve. Claude Bernard first demonstrated the secretory rôle of this nerve. Later experiments have shown that the secretory fibers carried by the auriculotemporal come neither from the inferior maxillary nor from the facial, but from the glossopharyngeal through the nerve of Jacobson which supplies the small deep petrosal nerve to the otic ganglion. Dieulafé believes that the cervical sympathetic and facial nerves also play a secretory rôle.

Deupès thus describes the course of the auriculotemporal nerve. It arises from the posterior branch of the inferior maxillary by roots arranged in the form of a buttonhole through which passes the middle meningeal artery, progresses toward the neck of the condyle, passes around this, penetrates the parotid gland, and runs toward the zygomatic arch in a vertical direction as far as its final distribution in the temporal region. Maigrot likened the course of the nerve to the shape of a Deschamps pedicle needle, whose concavity corresponds to the posterior border of the condyle; he divides it into three segments, the first from its origin to its entrance into the parotid, the second within the parotid, and the third the temporal portion. It is the second segment of the nerve which gives off the parotid fibers, behind the condyle; and this is the portion which must be attacked in order to suppress the secretion of the parotid gland.

Deupès thus summarizes the technique of resection of the auriculotemporal nerve in fistulæ of the parotid gland:

1. Local anæsthesia with novocaine adrenalin.
2. Vertical incision about 3 cm. in length half above and half below the zygomatic arch.
3. Search for the nerve. The pulsation of the temporal artery may be suppressed by the vasoconstrictor action of the local anæsthetic solution, and therefore this landmark may not be available. The nerve-trunk is behind the vessels, and it may be necessary to seek under the upper part of the incision a peripheral filament, and follow it down to the trunk.
4. Dissection of the nerve in the parotid sheath down to the lower part of the incision, i.e., to the glandular tissue.
5. Gentle traction on the nerve, according to the Thiersch method, with a hæmostatic forceps

in such a way as to obtain the greatest length possible before rupture. This stage is always rather painful.

6. Reunion of the skin edges with Michel clamps.

Deupès has performed this operation on two patients wounded by grenade splinters, in whom the injuries were almost identical. The projectiles had been exfoliated with some tooth fragments, and there was no other damage than that to the tissues of the cheek and to the parotid gland; a rather severe trismus and the fistulous tract were the only functional disturbances. The fistulous orifice was situated about 10 or 12 mm. in front of and a little below the lobe of the right ear. During feeding saliva appeared and flowed abundantly. In both cases, the salivary secretion ceased immediately after the operation.

Dieulafé also recommends the performance of a very extensive resection of the nerve. He reserves local anæsthesia for cases with no inflammation of the scar tissue of the region, while he prefers general anæsthesia in cases with inflammation. In front of the tragus an incision 4 cm. in length is made, ascending a little in front of the ear and descending as far as the posterior border of the jaw-bone a little below the neck of the condyle; beneath the skin in front of the ear the temporal artery is carefully sought by its pulsation. Behind the vessels, the nerve is found, isolated, seized in a flat-beaked forceps, and its peripheral end sectioned; descending through the gland the nerve is isolated. In some cases the anastomosing branch from the facial may be seen and cut separately. When the nerve has been isolated from the depths of the gland, a twisting motion is given to the forceps, the nerve being wrapped about the beaks as it stretches, the deepest portions are detached and it breaks solely by the mechanism of avulsion.

In operating in a cicatricial field, the search for the nerve is difficult, and it may be necessary to ascend into healthy tissue, find a peripheral branch and trace this down to the main trunk. The operation is useless if all of the glandular portion of the nerve be not resected, taking in all of the secretory fibers and the anastomosing branch from the facial. Dieulafé finds that the secretion of saliva always persists for a few days after the operation, but gradually disappears. He has successfully performed the operation in five cases, in two of which it was necessary to complete the cure by cauterization which had previously failed alone.

Fistulæ of Steno's duct. Dieulafé finds that the war has greatly enriched surgical practice in regard to fistulæ of Steno's duct. He has met with three forms: (a) very limited traumatism of the cheek by shell fragment, involving directly the duct of Steno and creating the fistula by a lateral section of the canal; (b) great destruction of the cheek by shell fragments followed by contractile scars occluding the duct, obliterating its normal orifice and leaving open the skin wound which involves it; (c) destructive traumatism by shell fragments, involving the bone and soft parts and giving rise to inflammatory phenomena which open an abscess and cause a fistula of the duct of Steno. The second form is by far the most common.

Taking into consideration the frequency of facial wounds in the present war and the extensive injuries which they produce, salivary fistula must be regarded as an uncommon complication. In the healing of wounds of this region the contraction of the scar tissue frequently acts as a spontaneous ligature of the canal followed by secondary arrest of the secretory function and glandular atrophy. In performing secondary cosmetic plastic operations in this region, it is frequently noted that no trace of the duct can be found in the mass of scar tissue. In view of this spontaneous tendency toward cure, fistulæ should only be regarded as permanent after persistence of salivary flow through an abnormal opening some time after the original wound has healed.

Symptoms. Generally there is a point of granulation situated in the region of the masseter or of the buccinator, through which clear fluid is seen emerging. This flow becomes very abundant during mastication, and is more marked in cases of parenchymatous fistulæ, because all of the parotid saliva is discharged through the opening. The quantity of saliva discharged is variable; a patient of Duphoenix lost 70 grammes in one-quarter of an hour; a patient of Jobert lost several cupfuls in twenty-four hours. Mischerlich has observed a fistula which only gave 60 to 95 gm. in twenty-four hours. Beaunis notes that the average amount of the secretion is between 80 and 100 gm. per day, while Hirschfeld has collected one-fourth of a liter at a single meal. The quantity of course varies according to whether the fistula is partial or complete.

At times the saliva accompanies purulent secretions arising from the inflammatory site with which the history of the fistula is bound up; at other times the salivary flow is the only symptom. The loss of a large quantity of a fluid which normally acts as a useful secretion and which contains mineral salts, especially chlorides and phosphates, leads at length to a weakening of the

organism; besides, the abundance of the flow itself constitutes a true infirmity. In these cases a more or less visible orifice leads down to Steno's duct. There exists at times a sort of cystic pouch at the site of the fistula, which empties itself easily by pressure. This pocket is caused by the accumulation of fluid between the wound in the canal and the cutaneous orifice. Its existence, when intervention is to be made, is a valuable landmark in the formation of a new duct.

Treatment. After reviewing all of the various procedures that have been suggested for the cure of fistulæ of Steno's duct, Dieulafé considers that the creation of an artificial passageway by transfixion through the cheek is most applicable to the majority of cases occurring in the wounded in whom as a rule the situation of the fistula and the scar tissue present do not permit a dissection of the posterior end of the duct. The technique followed is the same as that previously described under fistulæ of the parenchyma overlying the masseter muscle. Dieulafé has performed this operation four times, always successfully.

Transplantation of Steno's duct is advised by Dieulafé when one can find an appreciable segment of the posterior end which can be fixed to healthy oral mucous membrane. He has performed this twice successfully. Dieulafé hesitates to advise resection of the auriculotemporal nerve for fistula of Steno's duct, which should usually be susceptible of cure either by transplantation or transfixion.

Ligation of Steno's duct. Certain authors have obtained suppression of the parotid secretion by imitating a process that nature has put in practice in numerous face mutilations. In a large number of cases Steno's duct has been the seat of a destructive wound and later occluded by a cicatricial process causing all cessation of secretion and secondary atrophy of the corresponding parotid gland. Morestin is led to artificial obliteration of the duct by several considerations, as he has found in the patients treated that reimplantation of the duct after elimination of the fistulized portion was impossible, and internal drainage pure and simple rarely utilizable. His procedure, then, is to extirpate Steno's duct, ligate its stump at its origin, and obtain reunion without drainage. Obliteration of the duct brings about rapid physiological death of the parotid gland, but Morestin says that this has no perceptible effect on the organism. This complete radical operation has been done in thirteen cases with excellent results and Morestin now employs the method exclusively. In performing this operation it is important to remove all of the fibrous scar tissue through which the fistulous tract passed, so that only supple and healthy tissues are left.

Summary. From the experience of the four authors quoted, the most suitable treatment for the various forms of parotid fistulæ may be summed up as follows:

1. Glandular fistulæ. (a) For slight or moderate discharges, immobilization of the jaws, with or without cauterization; (b) for moderate or more obstinate cases, cauterization, or creation of an artificial opening into the mouth by transfixion of the cheek; (c) for persistent cases that do not respond to other treatment, resection of the auriculotemporal nerve.

2. Fistulæ of Steno's duct. (a) For cases in which an appreciable segment of the posterior end of the duct can be freed, transplantation of the duct into the buccal mucous membrane; (b) for cases in which the situation of the fistula and the scar tissue do not permit freeing of a sufficient segment of the posterior end of the duct, creation of an artificial opening into the mouth by transfixion of the cheek; (c) where internal drainage of the parotid cannot be brought about, permanent occlusion of the duct by ligature.

ANÆSTHESIA

The general consensus of opinion favors local and regional anæsthesia for the performance of secondary plastic operations on the face and jaws. The anæsthetic of choice is novocaine-adrenalin. The technique of regional anæsthesia for these operations is described in the papers of Thoma (88), and Canuyt and Rozier (7).

PROSTHETIC FACIAL RECONSTRUCTION

This question goes more or less hand in hand with that of replacement of lost portions of jawbone by artificial substitutes. The artificial restoration of features requires on the one hand great artistic ability and on the other mechanical ingenuity. Derwent Wood, a well-known artist, has made a special study of this question, replacing the lost features by painted copper masks (93). Pont (78, 79, 80) has also devoted considerable attention to the subject and has adapted a plastic material for this purpose, which can be adjusted from time to time by the patient himself.

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ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY—SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE

Walther, C.: Note on a New Method of Treating Elephantiasis of the Limbs (Note sur une nouvelle méthode de traitement de l'éléphantiasis des membres). *Bull. Acad. de méd.*, Par., 1918, lxxix, 195.

In the treatment of recent cases of elephantiasis, Walther has discarded the recognized methods, as he believed he could obtain a better and more lasting result by employing buried rubber drainage tubes which are perfectly tolerated by the tissues as proved by numerous examples.

He makes a small incision in the middle part of the antero-internal face of the thigh, another on the abdominal wall; a small non-perforated rubber drain, No. 10 or 12, is passed by a Chaissaignac trocar, a relay incision being made in Scarpa's triangle. The drain travels in the deep layer of the fascia superficialis against the aponeurosis. A buttonhole is made in the aponeurotic extremity in which the corresponding end of the drain is inserted. An eyelet is cut in the tube in order to insure drainage of the superficial lymphatics.

Details of three cases in which excellent results were obtained are given. W. A. BRENNAN.

ASEPTIC AND ANTISEPTIC SURGERY

Morrison, J. T., Hartley. J. N. J., and Bashford, E. F.: Delayed Primary Suture of Wounds. *Lancet*, Lond., 1918, cxciv, 534.

Early and thorough resection of wounds is now universally recognized as the great prophylactic against sepsis. The term "delayed primary suture" has been applied to all cases of suture performed during the first five days after infliction of the wound, with the exception of those closed at the preliminary cleansing operation.

Seriously wounded patients arrive at this hospital in the middle of the night and from thirty-six hours to three days after having been hit. They are made comfortable, lightly fed, and encouraged to sleep. The next morning wounds are examined and are X-rayed if there is any suspicion that a foreign body is still present. If the temperature is not rising and the pulse-rate is satisfactory, a moderate degree of fever is no contra-indication to suture at this stage. The wound must be free from all suppuration and all clinical evidence of infection. Smears by platinum loops passed into every suspicious nook of the wound are made and examined in the way laid down by Carrel. If not more than one bacillus or coccus is present in any one film of the microscope, or one diplococcus in three, suture can be successully done, and if a similar examination the following morning yields the same result, the operation is carried out.

The simplest technique is employed. Attention is paid to accurate apposition of the skin margin, to obliteration of dead spaces, and careful cleansing of the skin. There are few cases in which the dressings need be touched before the seventh day, and as a rule at that dressing every second stitch is removed, the remainder being cut on the tenth day.

Of 290 consecutive gunshot cases during the past six months, 36 were sutured within five days of being wounded. Thirty-one of these were up to suture standard, of which 28 made a perfect recovery, being healed on an average of 10.5 days from the date of suture. The remaining three cases were partially successful. The use of Carrel's bacteriological standard was of the greatest value in the choice of wounds for delayed primary suture.

At no period is a wound so easily closed as it is before the onset of cicatrization and fixation of tissues in abnormal positions. Closure of a wound obviates the danger of secondary infection, the expense and pain of many dressings, and leads to the quickest and most perfect restoration of function. To be able to close wounds of soft parts and convert compound into simple fractures is the ideal of military surgery. That this has been attained in 10 per cent of cases recently arriving from the front is a tribute to the work of the casualty clearing stations. V. C. HUNT.

Hartwell, J. A.: The Chlorine Antiseptics in Civil Hospital Use. *Ann. Surg.*, Phila., 1918, lxvii, 385.

The conclusions after four months' use of chlorine antiseptics at Bellevue Hospital are as follows:

The establishment of the Carrel-Dakin technique presents no undue difficulties.

The results obtained in military hospitals abroad can be duplicated in general civil hospitals in traumatic cases.

These antiseptics are not so efficient in controlling spontaneous infection.

Reasonable care prevents skin burns in all circumstances.

Dichloramine-T in either chlorinated eucalyptol or chloracosane is not a completely sufficient substitute for sodium hypochlorite solution.

The technique was entrusted to a special group of doctors and nurses and strictly adhered to. Cases upon which the treatment was used were fractures,

deep-seated infections, and superficial infections from burns. The progress of cases was followed by bacterial count of the wound, which was more accurate than depending on observation only.

Suppuration was controlled quickly in traumatic infection, but in burns and cases of infection from within, such as osteomyelitis, tenosynovitis, empyema, abscess of the lung, and abscess of the liver, it does not exert such an influence because the infective organisms are more deeply placed in the surrounding inflammatory zone.

No trouble was encountered from skin irritation. The surrounding skin was protected with vaseline gauze as described by Carrel. I. E. BISHKOW.

ANÆSTHETICS

Chaput, H.: Suppression of Chloroform Vomiting and Syncope by Discontinuous Chloroform Administration (Suppression des vomissements et des syncopes chloroformiques par le chloroformisation discontinue). *Bull. Acad. de méd.*, Par., 1918, lxxix, 173.

Discontinuous anæsthesia according to Chaput consists in administering chloroform until there is a loss of consciousness equivalent to the appearance of sensory anæsthesia, then suspending the inhalations and proceeding with the operation until the patient shows signs of returning sensibility, when the same course is again adopted.

Discontinuous anæsthesia is superior to complete because it is absolutely benign and better supported. It is never accompanied by vomiting or by syncope; it is superior to local or lumbar anæsthesia because fear and anxiety are suppressed. Chlorethyl and ether discontinuous anæsthesia are unreliable.

Discontinuous anæsthesia is contra-indicated in patients with respiratory trouble, or in operations which require complete muscular resolution, such as fractures, luxation, etc. W. A. BRENNAN.

Hyde, C. E.: Chloroform Poisoning. *N. Y. M. J.*, 1918, cvii, 67.

The author reports the case of a patient who took two ounces of chloroform to induce sleep and who was discovered just in time to save his life. The patient was a male, thirty years of age, a private tutor, who was found in deep coma lying on his right arm. There was a marked odor of chloroform on his breath. Respirations were deep and gasping in character; the pulse was very weak, hardly perceptible; the pupils were widely dilated, with no reaction to light or accommodation.

Gastric lavage, and stimulation with strychnine and adrenalin and electricity were used with good effect. The patient regained consciousness after seven hours. The musculospiral paralysis of the right arm from pressure gradually recovered. An unusual feature of the case was the appearance of blebs filled with serum on the lower extremities; these were largest on the plantar surfaces of the feet. ELLIS FISCHEL.

SURGICAL INSTRUMENTS AND APPARATUS

Harris, W.: A New Apparatus for the Treatment of Foot-Drop. *Lancet*, Lond., 1918, cxciv, 409.

This apparatus is used in the correction of drop-foot resulting from injuries to the sciatic and external popliteal nerves. A stout elastic is attached to the bottom two eyelets of the shoe. The elastic is supported by a strap passing up the trousers leg over the opposite shoulder with a strap about the waist to maintain its position. Patients suffering from drop-foot are able to walk with very little or no limp. It can be attached to any laced shoe. P. W. SWEET.

Broad, W. H.: A Pylon, or Temporary Artificial Leg. *Brit. M. J.*, 1918, i, 453.

After amputation through the thigh or leg there is progressive diminution in the girth of the stump, consequently the bucket of an artificial leg will in a few weeks become loose.

It occurred to the author that the bucket of a temporary leg might be made of papier-maché, which could be broken up and replaced or remoulded periodically until the stump reached its minimal circumference.

An accurate cast of the stump up to the height of fifteen inches is taken in plaster of Paris and on this cast a layer of soft felt is sewn; this in turn is covered with a layer of papier-maché, about five-sixteenths of an inch thick. A wooden base is fitted to the floor of the bucket and the bucket is then reinforced by four light metal bars which are welded at their lower ends into a tube, into which is fitted the wooden peg. The leg provides an accurately fitting bucket for the stump which can be fitted as soon as the stump is healed. The pressure can be regulated by adjusting the thickness of the pad at the bottom of the bucket. The cheapness of the material permits of the renewal or remoulding of the bucket at a trifling cost. V. C. HUNT.

Stansfeld, A. E.: An Apparatus for Transfusion of Blood by the Citrate Method. *Lancet*, Lond., 1918, cxciv, 334.

The author uses blood containing 0.5 per cent citrate by allowing a 5 per cent citrate solution to mix with the blood in the proportion of one to nine.

The apparatus consists of a graduated receiver into which the donor's blood is withdrawn, and a burette from which a regulated flow of the citrate solution joins the current of blood as close as possible to its exit from the vein. The receiver is of 750 ccm. capacity. Both receiver and burette are supported upon a wooden stand, the two parts of which can be disconnected for convenience of packing. The receiver is fitted with a rubber cork through which passes a glass T-tube, one limb of which carries a piece of rubber tubing closed by a clip; the other is connected at first with a suction bottle and later with a double bellows pump. The suction bottle is a spare receiver, and from its lower end runs a piece of

rubber tubing which can be closed by a clip. The apparatus is supplied with needles of two sizes, the bases of which are ground to fit into a glass T-piece which is connected by rubber tubing to the receiver and burette. The receiver is sterilized by dry heat and the remainder of the apparatus by boiling or steaming.

The apparatus is fitted up with the suction bottle full of water and the burette with sterile citrate solution. The citrate is allowed to flow from the burette at the rate of three drops per second.

The veins of the donor and recipient are usually those at the bend of the elbow. A tourniquet is applied and the needle introduced into the vein of the donor; the citrate solution from the burette is allowed to mix with the blood in the proportion of one ccm. of citrate to 9 ccm. of blood. When the desired amount of blood has been withdrawn, the citrate is discontinued, the needle removed from the vein, and the tube from the receiver is clipped. The blood is then gently pumped into the recipient's vein. V. C. HUNT.

SURGERY OF THE HEAD AND NECK

HEAD

Richter, H. M.: Head Injuries; Demonstration of Two Cases. *Surg. Clin. Chicago*, 1918, ii, 333.

All scalp wounds made by blunt force must be regarded as possibly accompanied by skull fracture or brain injury or both. Unless a condition of excessive shock prevents, immediate exploratory operation is advised without X-ray, unless immediately available. The scalp should be prepared as for a cranial operation, the wound disinfected, its edges excised, the underlying bone exposed and examined for fracture. If a foreign body is suspected, X-ray should first be taken.

If a fracture is present, the fragments should be elevated, hæmorrhage controlled and the wound closed without drainage, if it has been possible to excise all potentially infected tissue.

LISTER TUHOLSKE.

Gage, H.: Some Observations on Injuries of the Head. *Mil. Surgeon*, 1918, xlii, 276.

Injuries of the cranium are of importance only as they expose or injure the brain or its membranes. It is well to bear in mind that the cranium is a hollow shell with sufficient elasticity to bend and rebound, so that in the mechanism of injuries the lesion may be at the point of the blow or at a point opposite the point of contact, or the injury may result from the expansive force of a missile passing through the skull.

In mild cases, there is a partial unconsciousness from which it is possible to arouse the patient, followed by headache, dizziness, nausea and vomiting, and if the recovery is steadily progressive, it is considered a case of concussion. If the stupor persists and evidences of compression supervene, with delirium, slow pulse, restlessness and choked disc, it is considered contusion with hæmorrhage. Kocher views both these pictures as associated with hæmorrhage only of different degrees. In consideration of fracture of the skull, it is not of so great importance as to whether the fracture is compound, comminuted or simple, aside from the question of infection, as the amount of damage done to the brain and membranes. The danger of infection is always greater in fracture of the base than in that of the vault.

In the diagnosis one should be careful to differentiate between an indurated edge of a simple hæmatoma of the scalp and a depressed fracture. Lumbar puncture is of value in diagnosing a laceration of the brain substance.

The immediate dangers of fracture are sepsis and hæmorrhage. The complications that may arise are paralysis, mental defects, and epilepsy. To avoid the later complications one should at operation, after elevating and removing all spicules of bone, observe the dura, and if there is no pulsation, and it appears dark or cloudy, incise for subdural hæmorrhage.

The following rules for operation are laid down:

In cases of localized pressure with symptoms of paralysis or cortical irritation, operate.

In every suspicious borderline case, incise the scalp to determine the condition of the skull.

In every depressed fracture, elevate.

In all depressed or perforating wounds, remove all spicules and leave the edge clean and smooth.

Remove all foreign bodies if they are likely to cause infection or if they are giving rise to symptoms.

In the present war, it is the practice to operate as soon as possible, but an attempt is made to get the case back to the evacuation hospital. All infected and devitalized tissues are cut away. The French are most radical, doing all that is necessary at the evacuation hospital. The French have been filling skull defects with pieces of cartilage removed from the cartilage of the ribs. I. E. BISHKOW.

Ochsner, A. J.: Clinical Observations Concerning Malignant Tumors of the Jaws. *Tr. Am. Surg. Ass.*, Cincinnati, 1918, June.

This paper is based on the analysis of one hundred histories of patients operated upon for malignant tumors of the jaw by the author at the Augustana Hospital.

Especial stress is laid upon the importance of destroying the malignant growths very extensively, together with two centimeters of the adjoining tissue by the use of the actual cautery at the earliest

possible moment. Even in very early cases the cauterization should be done with great thoroughness. The cautery irons should be held in contact with the diseased tissue for a sufficiently long time to heat the tissues at a considerable distance from the point of contact.

Attention is drawn to the advantage of operating upon patients in the inverted Trendelenburg position, in order to reduce the amount of ether needed for anæsthesia. In order to reduce the secretion of mucus and the danger of inspiration pneumonia, a hypodermic of one-fourth of a grain of morphia and one one-hundredth of a grain of atropine is given one-half hour before the anæsthetic is commenced. The patient is anæsthetized in the horizontal position, and when thoroughly under the influence of the ether, the head of the table is raised to an angle of forty-five degrees and no more ether is administered during the operation.

The danger to the patient from metastases caused by the excision of portions of the growth or partial operation in the early stages of the disease is pointed out.

The patient is placed in the semi-sitting position in bed after leaving the operating table.

Blake, J. B.: Recurrent Dislocation of the Jaw. *Tr. Am. Surg. Ass.*, Cincinnati, 1918, June.

Recurrent dislocation of the jaw occurs infrequently. It is a painful and disabling condition and tends to grow worse. Its treatment is essentially surgical.

Recurrent dislocation of the jaw should be treated by operation. The coronoid process, or the insertion of the temporal muscle into it, should be tied up to the anterior part of the zygomatic arch. This may be done with silver wire or with slowly absorbable suture material. The operation, though not so easy of execution as it sounds, is less difficult than the attack on the temporomaxillary joint, is much more logical, and more mechanically efficient; it does not injure important structures, and the scar is not disfiguring. The result should be one hundred per cent success.

Report of one case of serious and very frequent recurrent dislocation (the jaw dislocated forty to fifty times, and often several times in twenty-four hours), treated by the operation described, was a complete success, with an almost invisible scar.

Speed, K.: Immediate Surgery of Gunshot Wounds of the Cranium; Reviewing 46 Craniotomies Within a Few Hours After the Reception of Wounds. *Surg., Gynec. & Obst.*, 1918, xxvi, 396.

Investigation of harmless appearing scalp wounds revealed three fractures in a series of 25 trial cases.

Excision of contused and simple infected scalp wounds affords opportunity for rapid and clean healing. Comatose cases are prepared immediately for operation. If the general condition is not good, stimulation precedes. The patients are given X-ray examination if time or conditions permit.

In investigating bone puncture or depression cases, care is taken to avoid any additional injury to the inner table or the extradural space, and to avoid opening the dura if the wound has not penetrated it. The operative field is kept clean by a stream of hot normal salt solution, which is used freely, and is effective in washing out foreign bodies and infectious material carried in by the missile. Foreign bodies easily accessible are removed, but track cleansing without foreign body removal should suffice if large intracranial vessels or the sinuses are endangered by manipulation.

The scalp should be closed completely by plastic manipulation to suit the individual case.

Observation of head cases causes the author to believe that hernia cerebri seldom follows early operation.

Depressed bone over a blood sinus is best left alone, rather than run the risk of exciting an uncontrollable hæmorrhage. Gauze packing or packing with a piece of muscle belly removed from another part of the patient is found to be effective in control of hæmorrhage.

In two cases of blood sinus injury the symptom of generalized muscular rigidity was notably present.

V. E. Dudman.

Halstead, A. E.: Meningeal Cysts. *Surg. Clin. Chicago*, 1918, ii, 41.

The author classifies meningeal cysts under two general heads: (a) those found at autopsy, which during life have produced no symptoms; and (b) those cysts which are known to follow definite trauma. These develop later in life.

He says that the relation of the cyst to trauma varies in individual cases. In some, the symptoms pointing to the presence of a cyst may be deferred for months or years after the injury, and these are known as traumatic meningeal cysts. When traumatic cysts follow close upon a trauma the mode of origin is easy to determine. Evidences of recent hæmorrhage are generally found with the cyst cavity and as a result of the effusion of blood the membranes have become separated. When the cavity has been gradually freed of the effused blood by a process of absorption of its cellular elements there remains a fluid which is identical with blood-serum, containing either a few blood-cells or blood-pigment.

In older cysts or those in which a considerable quiescent interval has elapsed between the injury and the formation of the cyst, the mode of origin is more difficult to explain. The presence of a low-grade inflammatory process, closing off a limited portion of the subdural or epidural space, is probably an important factor. Into these closed spaces an exudate takes place, probably from the perivascular lymph-spaces which remain open.

In old cysts where this inflammatory process has been active for a long time, the cyst wall becomes greatly thickened, and the rigidity which results unfavorably influences the prognosis after operation.

In traumatic meningeal cysts the symptoms are those of brain tumor. In the case which the author reports, headache followed by loss of vision were the only symptoms presented. Symptoms of cortical irritation may develop early or late. Halstead quotes a case in which jacksonian epilepsy began four years after a compound depressed fracture of the parietal bone, the result of a kick by a horse.

In general, two groups of symptoms may be described in connection with meningeal cysts: (1) Severe nervous symptoms may appear immediately or soon after the accident, convulsions, paralyses, prolonged coma, delirium, and focal symptoms, depending upon the site of injury. (2) The symptoms following the accident may be insignificant or absent. These may be only those that could be attributed to slight concussions, e.g., vertigo, headache, vomiting, etc. Months or years afterward serious symptoms may first become manifest. Headache, choked disc, vomiting with focal symptoms, including jacksonian epilepsy, may develop.

The early development of focal symptoms leads to early operation, and in this way gives a more favorable prognosis than when the symptoms are delayed. Halstead states that in the recorded cases the duration of the quiescent period has been as long as eight years.

As to surgical treatment, the procedure to be followed depends largely on the character of the cyst wall and the location of the cyst, particularly its relation to large blood-vessels. The ideal procedure in epidural cysts is to remove the overlying bone, excise the dural membrane forming the inner wall of the cavity, and fill in the defect left in the dura with a fascial transplant. The cranial defect may or may not be closed. In the majority of cases where there is no active inflammatory process found, there is no probability of hernia cerebri following. Unsightly depressions due to larger defects in the skull may be closed by bone transplant or by any of the other well established methods of closing these defects. As a general rule the skull defects should be closed some time after the primary operation for removal of the cyst wall and the closure of the dural defect.

The success of the operation in subdural cysts depends largely upon excision of a considerable part of the cyst wall and the filling of the cavity with some substance that will close the cavity temporarily, allowing the brain to gradually regain its normal contour, thus permanently obliterating the cavity. The most satisfactory method is to fill the cavity with a transplant of fat with sufficient fascia attached to close the defect in the dura. This fat, which is obtained from the thigh, is gradually absorbed, the brain expands as absorption progresses, and the cure is permanent.

The other methods which have been employed are: (1) puncture, which is invariably followed by a refilling of the cyst; (2) puncture and drainage, which in recent cysts may effect a cure. In older cysts an essential feature, if cure is to be expected, is excision of the cyst wall.

Halstead reports a case of hernia cerebri over the occipital region accompanied by blindness and deafness in the left ear. This patient's only symptom was constant headache. Shortly after the onset of the headache, a decompression was performed. Six months after the operation a swelling began to form over the site of the decompression. One month later vision began to decrease and then the left ear became deaf. The Wassermann was negative on blood and spinal fluid. Globulin tests on spinal fluid were positive.

The patient was operated upon by Halstead. A large cyst was found between the temporosphenoidal lobe and the parietal bone. About 27 ounces of fluid were withdrawn from the cyst. The lining of the cavity was removed and the cavity filled by a transplant of fat and fascia. He does not report the final result. G. W. HOCHREIN.

Castex, M. R.: General, Differential and Etiological Diagnosis of Cerebral Tumors (Diagnostico general differencial y etiólogico de los tumores cerebrales). *Rev. Asoc. méd. argent.*, Buenos Aires, 1917, xxvii, 770.

In the majority of cases of cerebral tumor there is a syndrome of endocranial hypertension which varies with the nature, localization, and development of the tumor. Evolution without signs of hypertension is less frequent and is more usually met with in cases of glioma, angioma, or hard sarcoma.

Hypertension is early and intense in tumors of the posterior cranial fossa. Headache, amblyopia, vomiting and vertigo are the cardinal symptoms. The first two symptoms are the most constant. Headache of itself is of little value as an aid to localization but amblyopia may be of diagnostic value. It is early and intense in the case of basal tumors and those of the posterior fossa; it may be absent or very slight in frontal and parietal tumors.

Local subcutaneous venous reticula, localized pain on pressure, ictus epilepticus, convulsions, disturbances in pulse, respiration, urinary function, or temperature, while confirmatory, are less important than the foregoing signs.

The diagnosis must be differentiated principally from syphilis and will depend chiefly on the history and existence of syphilitic indications. The hæmatologic signs and alterations in the spinal fluid are very untrustworthy and the author, after trying them in a very large number of cases, has concluded to rank them as of no diagnostic value. This includes the Wassermann and Nonne-Appelt tests.

Pseudo-cerebral tumors are almost without exception due to hereditary syphilis. In them symptoms of cortical and focal irritation are less frequent than in true tumors.

General progressive paralysis is clearly distinguishable on accurate study of the history and symptomatology. Cerebral abscesses are always

secondary to otorrhœa, sinusitis, or traumatism. Cranial puncture will decide the diagnosis in such cases.

Tuberculomata may be diagnosed from the antecedents, and other bacillary locations. Cranial puncture will give a histologic or bacteriologic diagnosis. Cranial puncture is the only method which permits a differential diagnosis from circumscribed serous meningitis. W. A. BRENNAN.

NECK

Haynes, R. S.: The Differential Diagnosis of Enlargement of the Cervical Lymph-Nodes. *N. Y. St. J. Med.*, 1918, xviii, 91.

According to Haynes, enlargement of the cervical lymph-nodes is among the commonest of the affections of childhood. It is most commonly secondary, but may be primary.

Enlargement of the cervical lymph-nodes may be divided into: (a) inflammations, simple or tuberculous; (b) hyperplasias; and (c) neoplasms. In making this classification one must bear in mind that these pathological processes do not adhere consistently to particular disease entities, but that both hyperplasia and inflammatory swelling may result from infection; and that a neoplasm may become the seat of active inflammation.

In making the differential diagnosis one should ascertain the character of the malady, the primary source of infection if one be present, and the type of infection. One should also make a careful study of the patient's history, paying particular attention to the conditions under which he lives. He lays particular stress on the fact that in differentiating from syphilis one should remember that the enlargement of the cervical nodes which occurs in syphilis is part of a general adenopathy affecting the liver, spleen, inguinal and epitrochlear nodes, and that the history of miscarriages, stillbirths and early deaths in the family is of importance.

He discusses the anatomy of the cervical region, which is of importance to surgeons.

He says that the differentiation between simple and tuberculous infections is sometimes very easy and often very difficult. In children under two, an adenitis is more apt to be simple than tuberculous. When the enlargement is due to pyogenic infection, there is likelihood of evidence in the mouth, throat, or nasopharynx of inflammation of the structure in these localities. The absence of such in the presence of cervical swelling is significant of tuberculosis. Usually with pyogenic infections the swelling is larger, comprises more lymph-nodes, has more perinodular swelling, is tender, reddened, hot and elastic, all the tissues being bound up in the swelling. In the later stages of tuberculous enlargement there may be just as many glands enlarged, there may be matting together and adhesions to the skin and deeper parts, but only exceptionally will there be much tenderness, redness or heat. Softening, if it occurs, will point and discharge and subside if the process is pyogenic, while sinuses will persist if it be tuberculous.

Examination of the blood should show a polynucleosis in the pyogenic, and a lymphocytosis in the tuberculous enlargements, but this rule is not absolute.

The tuberculosis complement fixation test should be positive in the tuberculous enlargement and negative in simple adenitis. It may nevertheless be positive in simple adenitis when there are foci of tuberculosis elsewhere. A negative von Pirquet reaction is a very valuable evidence of pyogenic infection. It is also of considerable value when positive in children under five years. It may be truthfully stated that under five years the coincidence of a lymph-node enlargement and a positive von Pirquet reaction is very good evidence that the enlargement is tuberculous in nature.

Roentgen ray examination of the head, if it discloses tooth abscesses, will be of help in placing the stamp of a pyogenic infection on a questionable enlargement; if it discloses calcareous deposits within the area of the cervical enlargement, it will point toward tuberculosis. Examination of the thorax showing extensive tuberculous involvement would offer corroboration that a similar condition was present in the cervical lymph-nodes.

The evidence obtained from the examination of excised adenoids and tonsils may very often be inconclusive. Tuberculosis of a tonsil may not be evident without prolonged serial examination. Tubercle bacilli may be obtained from aspiration of softened areas of the enlargement mass. Softening, however, is a condition one should feel ashamed to have supervene in cases of cervical adenitis which are under his care.

With all these diagnostic factors considered, excision may be necessary to verify the differential diagnosis. G. W. HOCHREIN.

Voorhees, I. W.: Cervical Gangrene Complicating Ludwig's Angina. *Laryngoscope*, 1918, xxviii, 177.

The case reported by the author was that of a man aged fifty-one who developed a swelling under each side of the inferior maxilla corresponding to the site of drainage from the lower canines which were infected and extracted. The cervical swelling continued so that two external incisions at a weekly interval were made, the first parallel with the lower border of the maxilla, the second just above the clavicle. Necrotic tissue kept sloughing away, exposing the maxilla, but finally the wound became clean and healing occurred. OTTO M. ROTT.

Pfahler, G. E.: Roentgenotherapy in Cervical Adenitis. *N. Y. St. J. Med.*, 1918, xviii, 99.

Pfahler quotes many authorities to show the increasing frequency of cervical adenitis. As a result of his investigations he believes that more attention should be given to the subject than heretofore. He believes that each case should be studied individually and the source of infection searched for and

treated. Diseased tonsils should be removed and diseased teeth treated.

If the glands are soft, fluctuating or tender, at least the affected soft gland should be incised and drained. If the case is of recent origin and the glands are not soft, he believes that in the majority of instances the glands can be made to disappear under the influence of roentgen rays properly administered. Whenever a child is operated upon for cervical adenitis, the operation should be followed by at least one or two full courses of postoperative X-ray treatment. The hygienic conditions under which the patient is living should be improved as much as possible, and good food, fresh air, and tonic treatment will be beneficial.

His technique of roentgenotherapy is to employ hard rays thoroughly filtered, using a tube which will back up a nine-inch parallel spark gap, which is equivalent to approximately nine on the Benoist scale. These rays are filtered through six millimeters of aluminum. He applies the rays for forty milliampère minutes through each portal of entry, protecting the hair and face by sheets of lead. The focal distance from the target to the skin is eight inches.

He calls attention to the necessity of avoiding a dermatitis or a subsequent telangiectasis, and emphasizes the fact that if roentgenotherapy is to be employed in cases of cervical adenitis, it should be done by a skilled roentgenologist who understands the importance of measuring his doses, of giving sufficient treatment to produce results and yet not enough to damage the skin; it should not be given by a nurse or an orderly.

He makes the following conclusions:

1. Cervical adenitis is a frequent disease and deserves more serious consideration.
2. Each case should be studied as an individual, and every means employed that will produce beneficial results.
3. Roentgen rays can be expected to relieve completely the early cases.
4. Softened glands should be opened and drained as abscesses.
5. Patients who have been operated upon should receive postoperative treatment to prevent recurrences.
6. These cases require skillful technique, whether it be surgical or roentgenological.

G. W. HOCHREIN.

Beebe, S. P.: Ten Cases of Thyroid Disease. *Med. Rec.*, 1918, xciii, 705.

It is the purpose of the author in presenting ten cases of thyroid disease to illustrate some of the conditions that demand relief, and to describe in some detail the methods that have been followed in their treatment. In his experience no one method is suitable for all cases and the good effects as well as the limitations of methods now in common use will best be presented with actual cases to serve as a text. The history of the cases is fully given with the method and kind of treatment instituted in each case cited.

Beebe has discussed the relation of nose and throat infections to the development of goiter in a previous publication, but approximately 40 per cent of the cases that have come under his observation have shown such coincidence.

The author has seen four cases of extremely toxic menstrual periods complicating Graves' disease. The history of one is fully given. All were women over forty years of age. In the second the ovaries were removed by vaginal section. The case made a complete recovery, and is now well. In the two others the condition was controlled by active treatment of the lower pelvis with X-ray. While somewhat slower in operation, this procedure has been found equally effective. In the operated cases the ovaries were found to have many small cysts.

The menstrual function is often disturbed in hyperthyroidism; in most cases the gland becomes more swollen, all the symptoms of the disease are more pronounced during this time, but extremely toxic periods are quite uncommon. It is, of course, not unusual to find a complete cessation of the periods during the more active stages of the disease.

It has been observed by many men that dietary conditions have an important bearing in both etiology and treatment. Watson has found that rats fed on a meat diet show thyroid hyperplasia. The relation of toxins from the intestinal tract to the origin and maintenance of hyperthyroidism has been emphasized by many authors.

Beebe believes that there is danger in dealing with these cases from a one-sided standpoint or a pet theory to the neglect of obvious fundamental conditions of common-sense treatment.

Iodine, X-ray, diet and clean bowels will relieve a large percentage of some cases, but no attempt should be made to do it in a few weeks. A gradual change is much safer for the patient. The iodine should be continued in such cases in spite of mild hyperthyroid manifestations.

Simple colloid goiter is not necessarily a surgical condition according to the author's belief. No type of thyroid enlargement is normal and it should not be slightingly treated. Cases of the sort mentioned very frequently show at a later stage the characteristic manifestations of severe thyroid disease.

Cancer of the thyroid is nearly always superimposed upon a goiter of some years' standing. In other cases that have come under the author's observation, thyroid enlargement without marked symptoms had been noted for several years before the change to a malignant condition was observed. In most cases thyroid carcinoma grows rapidly when once initiated, so that a period of nearly three years between operation and fatal outcome is quite unusual. Beebe has had four cases with early operation for cancer of the thyroid but no after-treatment, and death followed in all of them in less than one year and in each case there was extensive recurrence and infiltration at the site of operation.

Thyroid hyperplasia, giving rise to the symptoms recognized as Graves' disease or exophthalmic goiter, has not, in the author's observation, given rise to a later malignant growth. While the carcinomatous thyroid undoubtedly has some true thyroid function, as evidenced by the myxœdematous symptoms following its removal and by the occasional observation of relief from such a condition when metastases have developed, it does not appear that the excessive activity found in Graves' disease has ever been noted in such glands. Any successful treatment of thyroid carcinoma must be prophylactic rather than curative.

Beebe desires to emphasize that each case is a problem in itself and requires a careful analysis of all the factors involved, to get the best results. Medical treatment is not a spectacular method, and the long-continued action of mild corrective measures is advisable. The gland is responsive to a variety of disturbing conditions, and no method of treatment, medical or surgical, that confines its action to a direct assault on the gland and does not remove the factors which disturbs its normal functioning, can succeed in practice. E. C. ROBITSHEK.

Mayo, C. H.: The Principles of Thyroid Surgery. *Tr. Am. M. Ass.*, Sect. Surg. General & Abdom., Chicago, 1918, June.

The thyroid undoubtedly is one of the most important glands in the body, and while a complete knowledge of its activities is still lacking, the work of Plummer and Kendall, through investigations into the physiologic action of its secretion, is such as to nearly accomplish the realization of its fundamental effect on life. Kendall has been able to separate the compound of the thyroid containing iodine from the balance of the gland. This is accomplished by destroying the proteins of the thyroid by means of boiling with a strong alkali, which does not decompose the iodine-containing compound, and, by suitable treatment, it can be separated as a pure crystalline substance containing 65 per cent of iodine; its formula is $C_{11}H_{10}C_3Ni_3$. The compound contains an organic nucleus called indol, as well as oxygen. Investigation of the activity of the gland shows that the iodine is not directly involved in the functionating of the substance but merely increases its power to react.

Plummer, from a clinical standpoint, in the observation of many thousands of cases of goiter, numerous cases of cretins and of myxœdematous patients, has shown that the rate at which energy is produced by the animal organism is controlled by the amount of thyroxin which is acting within the cells of that body. While not the only factor influencing the rate at which one lives, it probably has more to do than any other substance with the governing of the speed at which energy is produced in the body. Plummer shows the average basal metabolic rate of exophthalmic goiter patients at the time of coming under observation to be 52 per cent above normal, and the average rate in those in whom ligations were done and who returned in three months to be plus 39 per cent. The average metabolic rate eighteen days after thyroidectomy is plus 19. Ligation probably causes the metabolic rate to drop approximately 20 per cent. Other factors being constant, the total energy output of the body varies with the amount of thyroxin in the tissues and the rate of excitation.

In persons under twenty-five years of age, small adenomata in the thyroid and the simple colloid goiters are only occasionally recommended for surgery. Later in life, the degenerations which occur in goiters of long standing, such as encapsulated adenomata and encapsulated colloid areas when the secretion has become reduced, may develop thyrotoxic conditions.

SURGERY OF THE CHEST

CHEST WALL AND BREAST

Mabee, O. R.: Duct Papilloma and Duct Carcinoma of the Breast. *Canad. M. Ass. J.*, 1918, viii, 225.

The author reports eight cases of duct tumors of the breast in a total of 529 breast tumors examined in the department of surgical pathology at the Toronto General Hospital during the last ten years. In this series of cases, five were duct papilloma and three duct carcinoma. Seven occurred in married women and 75 per cent of these were in parous women. Their ages varied from thirty-six to fifty-two years.

Physical examination showed a tumor situated usually centrally in the breast, but sometimes, as in two cases, at some distance from the nipple. They varied in size from a pigeon's egg to that of a small orange. In the benign cases the mass was localized, slightly irregular and moderately firm. Two of the malignant cases showed extensive infiltration of the surrounding breast tissue and gland metastases; the other malignant case showed an oval mass the size of a hen's egg and its malignancy was only determined by the microscope. Retraction of the nipple and dimpling of the skin were present in only one of the malignant cases. Pain was present in four cases, being most marked in the malignant cases. Bloody discharge from the nipple was present in five cases.

The tendency of duct papilloma of the breast to undergo malignant change argues against conservative surgery in these cases. At least a simple amputation should be done in cases which show

no clinical evidence of malignancy. In the malignant cases the more radical the operation, the less liability of recurrence there will be. In doubtful cases, the microscopical examination will be the guide as to how radical the operation should be.

E. B. FREILICH.

Meyer, W.: Postoperative Thoracic Drainage. *Tr. Am. Surg. Ass.*, Cincinnati, 1918, June.

It is a matter of self-understanding that the surgeon will in the course of his intrathoracic work come across cases in which he finds drainage of the chest imperative.

If he does drain, postoperative acute pneumothorax with its serious sequela is the inevitable consequence.

It was but natural that surgeons tried to find ways and means to drain the pleural cavity and incidentally try to avoid the threatening subsequent acute pneumothorax.

It is emphasized by the author that the treatment of empyema is excluded from this discussion.

The problem of postoperative drainage, avoiding at the same time the collapse of the lung, was solved by the author in 1911. He kept the patients after the operation under differential air pressure for fifteen to twenty hours; having drained the chest with cigarette drains and rubber tubes through a stab, after closure of the incision in the same fashion as is customary when draining an infected intra-abdominal field. The stab was made in the ninth or tenth intercostal space in the scapular line. Tube-ends and the non-voluminous dressings outside were covered with a large piece of rubber dam. The latter is of importance; it works as a valve which prevents the entrance of air into the chest after the patient has been removed from the differential pressure apparatus. Very satisfactory results were obtained with this method of postoperative thoracic drainage. However, it is rather cumbersome, inasmuch as two or three special nurses are needed for carrying out the after-treatment.

Tiegel of Dortmund proposed a special metal drain with a rubber dam cover outside, the latter acting as a valve. He personally has seen good results in using it.

In endeavoring to simplify postoperative thoracic drainage, the author struck on Kenyon's method, which consists in pushing a rubber tube through a small incision in the intercostal space in air-tight fashion into the pleural cavity and holding it firmly in place by special device. The outer end is then connected with a bottle partially filled with fluid under the bed. An interposed glass tube allows one to watch the characteristics of the drained fluid. The apparatus works by syphonage; it allows the exit of the fluid from the chest and prevents the return of air into the same. The lung can thoroughly distend and incidentally effused fluid be drained off.

The author has tested this method in six cases of intrathoracic operations, namely, on lungs, exploratory thoracotomy for œsophageal carcinoma, resection of the chest wall, etc., with very satisfactory results. He considers this simple method very promising for quickly pushing ahead successful results of intrathoracic operations and advocates the application of the same in every case of such interference.

Attention is also drawn to the fact that the frequent, often deadly pressure-pneumothorax following a so-called internal injury, after crushing of the chest, may be successfully overcome by this simple method.

Whittemore, W.: The Surgical Treatment of Empyema. *Boston M. & S. J.*, 1918, clxxviii, 360.

Whittemore finds that the old rib resection and tube drainage for empyema is followed by a mortality of about 20 per cent. This at least is the experience at several large eastern hospitals. Furthermore, cases that survive the operation are prone to become chronic. The lung in its more or less collapsed condition becomes covered with a thick pyogenic membrane and cannot expand. It seems very probable that one important cause for the failure of the lung to expand is the positive pressure through the drainage tube. At any rate the high mortality and the large per cent of chronicity following this operation leaves much to be desired.

Lilienthal's operation, in which the whole thoracic cavity is opened wide by rib spreaders, after a long intercostal incision, is the operation of choice in all acute cases. Adhesions are broken up, pyogenic membrane covering the visceral and costal pleura is removed, allowing the lung to expand fully. The wound is then closed tight except for a rubber tissue wick at either end of the incision. There is surprisingly little shock following such an operation, the patient is more comfortable than following any other type of operation for empyema, and the convalescence is much shorter. All drainage is removed in a week to ten days. Whittemore has done this in 12 cases, and all have done well except one baby who died two days following operation from cerebral embolus.

In desperately ill patients it may be necessary to do a preliminary drainage operation to tide the patient over. Whittemore has used with good success a large catheter inserted through a large trocar and sutured in place, the trocar being withdrawn. The end of the rubber tube attached to the catheter is kept in a bottle under water to prevent air entering the pleural cavity. After several days suction is used to aspirate the remaining exudate. When only two ounces are obtained in twenty-four hours, all apparatus is removed.

In encapsulated empyema exploratory rib spreading thoracotomy should be done. The guide to a small amount of encapsulated pus is adhesions. The pleura should be protected by walling off gauze before opening into the abscess. Wide open thoracot-

omy should be done under positive intratracheal pressure as this will prevent collapse of the lung when there are no adhesions and it will aid in expanding the lung when already partly collapsed. The patient should be in a prone position.

In the chronic cases in which the cavity is lined with a thick pyogenic membrane, the best treatment is a combined Schede and a complete decortication of the lung and excision of the parietal pleura. The wound is closed tight except for a small rubber tube at one angle. The rubber tube is tied off and opened only after forty-eight hours to allow accumulated serum to drain off. It is then tied again. Some simple drainage operation may be necessary as a preliminary step to this radical procedure.

Paravertebral anæsthesia is the most satisfactory regional anæsthesia. Intratracheal ether is the best form of general anæsthesia. It gives enough pressure to expand the lung and is not followed by bad results. C. A. HEDBLOM.

TRACHEA AND LUNGS

Grant, J. D.: A Case of Pretracheal Abscess of Acute Development, Producing Dysphagia and Dyspnœa. *Proc. Roy. Soc. Med.*, 1918, xi, Sect. Laryngol., 72.

A woman, aged forty, was seen by the author complaining of occasional loss of voice for the past two years. Examination of the nose and throat revealed a perforation of the quadrilateral cartilage from a simple ulcer, and active lupoid ulceration on the anterior edge of the right inferior turbinate. The larynx was normal, with the exception of paresis of the internal tensors of the cords.

A solution of chloride of zinc was applied to the vocal cords and a nasal wash was ordered. Two weeks later she showed a painful swelling in the neck, difficulty in breathing and pain on swallowing. Examination at that time found the larynx in the same condition as before, but there was a red tender swelling over the region of the thyroid body. On the following day the abscess was opened and the pus evacuated.

The pus contained some streptococci and staphylococci, but no tubercle bacilli. After ten days the wound had practically healed. The author was unable to trace the cause of this abscess.

E. B. FREILICH.

Milligan, W.: Fracture of Four Rings of the Trachea; Urgent Dyspnœa; Operation; Recovery. *Proc. Roy. Soc. Med.*, 1918, xi, Sect. Laryngol., 54.

The author reports the case of a female munition worker whose scarf was caught in rapid revolving machinery, all but strangling her. Urgent dyspnœa, pain in the neck, and a bloody expectoration followed. A tracheotomy was performed and four tracheal rings were found fractured. Tracheal stenosis followed as a sequela and bronchoscopic tubes of increasing size were used to dilate the stricture. H. H. FREILICH.

Lapointe, A.: Extraction of Intrapulmonary Projectiles (A propos de l'extraction des projectiles intrapulmonaires). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 152.

Lapointe has made 19 deferred extractions of pulmonary projectiles. In 5 cases he tried Petit de la Villeon's method by forceps extraction under continuous guidance of the radioscopic screen. He succeeded only in 1 case and had to terminate the other 4 by thoracopneumotomy. In the remaining 18 of his 19 cases therefore he proceeded by thoracopneumotomy, using the radioscopic screen for control. He does not think it is necessary to make a large thoracic flap in any case or even a costal resection in many cases. In young patients an intercostal incision of 10 to 15 cm. made in the anterolateral part of the thorax with the use of a good retractor allows the introduction of the whole hand into the thorax. In this way Lapointe has made 5 extractions by the anterior or lateral route on a free lung.

The intercostal incision gives access to the phrenic center without costal resection. Near the sternum, where the ribs are easily separated, section of the third cartilage enabled Lapointe to remove a bullet from the right lung. Thus costal resection is far from being always necessary in deferred extractions of lung projectiles and may very often be omitted in early extractions when there are neither adhesions nor thoracic deformation.

Lapointe's 18 pneumotomies included 10 extractions in cases of a free lung or a lung freed of adhesions by the fingers; and 8 extractions in cases of a fixed lung. After finding and extracting the projectile he, like Duval, always sutures the torn lung and seals the thorax hermetically by suturing the muscles and skin. Recently he has omitted aspirating the air left in the pleural cavity, as it gives no trouble. This operation which Lapointe has done in 10 cases is the ideal pneumotomy, Duval's operation, omitting the employment of a compass and in half of the cases omitting costal resection.

All 19 patients referred to recovered without serious incident. Among the 10 cases with the free lung, 8 cicatrized *per primam* and the majority left the hospital within twenty-five days after pneumotomy. In a few cases however the wounds were not completely cicatrized until four months later.

The 8 operations on a fixed lung without exteriorization or pulmonary suture progressed also without serious postoperative incident.

In a word, thoracopneumotomy under the control of the radioscopic screen has given the author every satisfaction in late extraction of intrapulmonary projectiles. There was no mortality and no serious complication in 18 cases.

W. A. BRENNAN.

HEART AND VASCULAR SYSTEM

Delbet, P.: Clinical and Operative Study of Foreign Bodies in the Heart (Étude clinique et opératoire des corps étrangers du coeur). *Paris chirurg.*, 1917, ix, 525.

Delbet gives the full clinical details of the case of a soldier with an intracardiac foreign body which he successfully operated upon. The case was briefly referred to some time ago by Delorme. In addition, Delbet makes a historical review of cardiac surgery from the earliest time.

In Delbet's personal case the intracardiac position of the projectile was assured by repeated radiologic examinations. As it was apparently well tolerated, the wisdom of surgical intervention was doubtful, but the man's condition grew worse and it was decided to operate.

An H-incision was made at the left sternal border, the vertical cut being 1 cm. long and the two transversal being about 6 cm. and 10 cm. respectively. On cutting down and sectioning the ribs, the pericardium was found intimately adherent to the heart but was easily detached by the finger. The heart was explored and the foreign body easily located embedded in the middle part of the right ventricle. Delbet wished to exteriorize the heart through the thoracic opening but had to enlarge this in order to do so. The heart, seized in the operator's left hand, was brought out through the wound. He found that the ventricle was soft and depressive and could be folded between the fingers. He decided therefore to take advantage of this in order to squeeze the projectile toward the outside, and while effecting hæmostasis with the pressing fingers, to incise the edge of the fold and extract the foreign body.

This maneuver succeeded admirably. The right edge of the heart was incised for about 3 cm. Only a few drops of blood escaped. A Kocher forceps was introduced into the incision and the foreign body rapidly seized and withdrawn. Three sutures with No. 2 catgut were immediately placed, reinforced, and the heart returned to its place. The thoracic wounds were hermetically closed without drainage.

The operation lasted three-quarters of an hour. The piece of projectile extracted was an irregular cube of steel, 1½ cm. to a side. It weighed fourteen and one-half grams. The postoperative course was good and the man was up three weeks after operation. He had made a perfect recovery five months later.

Delbet refers to the literature of heart wounds, both in ancient authors commencing with Hippocrates, and in the anatomoclinical period beginning with Ambroise Paré. A third period opens with Larrey, the period of medical treatment. The modern period commences with Delorme's "*War Surgery*" in 1915 in which he recommended that suture of heart wounds, though difficult, should be attempted. It had been done experimentally. Contemporary surgery has gone even further. Not content with stopping hæmorrhage, it has endeavored to remove foreign bodies and to remove consecutive pericardial adhesions.

Delbet takes up the detailed study of foreign bodies and adhesions. Foreign bodies in the heart are in general well tolerated; their extraction is only exceptionally indicated. Of all heart injuries seeking surgical aid, as gathered in the medical statistical literature, about 10 per cent have a foreign body in the heart. Thus Fischer's statistics of 401 cases give 47 with a foreign body.

A foreign body may be lodged in any cavity of the heart, the auricle or ventricle, right heart or left heart. The author gives tables to show that projectiles of war, like other foreign bodies, principally occupy the ventricles, the right somewhat more frequently than the left.

It seems almost impossible that the heart should be attacked without a concomitant wound of the lungs or pleura. Nevertheless such cases are not frequent.

Massive infections of the pericardium are rare. In old cases the formation of adhesions is very often met. Internal inflammatory reactions are rare and it was noted in several autopsies that internally the heart did not show any visible alterations.

The article is to be continued in a later issue, taking up the question of adhesions.

W. A. Brennan.

Debeyre, A.: Late Migration of a Bullet from the Inferior Vena Cava to the Right Ventricle; Section of the Renal Pedicle (Migration tardive d'une balle de fusil, de la veine cave inférieure au ventricule droit; section du pedicule rénal). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 442.

The case reported by Debeyre is curious and rare. The facts were established at the autopsy of a soldier dying a few months after having been shot in the lumbar region.

The trajectory of the bullet apparently was through the anterior face of the right kidney, gliding along the vascular pedicle of the kidney and penetrating the externoposterior part of the inferior vena cava. The renal artery was obliterated. The bullet had apparently remained quiescent in the vena cava for about six weeks, then migrated to the auricle, then fell into the right ventricle and remained fixed in it between two small projections in its antero-inferior part. W. A. Brennan.

PHARYNX AND ŒSOPHAGUS

Matlack, J. A.: Roentgen Diagnosis of Lesions of the Œsophagus. *Colorado Med.*, 1918, xv, 94.

The advantages claimed by the author for the roentgen method of examination of lesions of the œsophagus are greater ease, simplicity and accuracy, and less discomfort to the patient than with the older methods. The opaque meal is observed as it passes down the œsophagus with the patient in the

oblique diameter in back of the fluorescent screen. Extrinsic and intrinsic obstructions may thus readily be observed. Benign constrictions are usually less irregular and less extensive than malignant. Diverticula may be seen as rounded sacs. In cardiospasm the œsophagus appears as a fusiform sac of regular outline and more or less dilatation. In all cases final interpretation of the roentgen findings must be made only after careful consideration of all available clinical data. ADOLPH HARTUNG.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Mayo, W. J.: Secondary Tuberculous Peritonitis; Its Cause and Cure. *Tr. Am. M. Ass.*, Sect. Obst., Gynec. & Abdom. Surg., Chicago, 1918, June.

Tuberculous peritonitis is not a primary disease, but like septic peritonitis is symptomatic, having its origin in some local focus of infection. The most common sites of such local foci are the fallopian tubes in women, some part of the intestinal tract in both women and men, and the lymphatic glands and channels, especially in children. Occasionally, the primary focus will be found in the stomach, the spleen, the liver, the gall-bladder, or the genito-urinary tract. To consider tuberculous peritonitis as an entity or to treat it as such leads to confusion, whereas if it is looked on as a secondary process, due to some primary focus, one is led to search for the primary focus and to direct treatment leading toward cure.

In tuberculosis the fimbriated extremities of the fallopian tubes are usually open, quite the opposite from the condition that exists in gonorrhœal infection, in which they are closed, forming pus tubes. In tuberculosis the material from the tuberculous process passes out from the open fimbriated extremity of the tube into the abdominal cavity, causing a more or less generalized peritonitis. Such peritonitis is essentially a conservative process leading to the destruction of the noxious agents. When the source of the infection can be removed, the peritoneum returns to normal. Simple laparotomy sometimes cures the peritonitis when tapping would be of no avail, because when the fluid is completely removed from the peritoneal cavity, as by operation, the fimbriated ends of the tubes, which had been mechanically separated by the fluid from the surrounding tissues, may become adherent to neighboring structures, thus closing the ends and preventing further leakage, and tuberculous pus tubes result with few symptoms.

Present knowledge of tuberculous peritonitis, the result of tubal disease, is fairly adequate, but when the local lesion is elsewhere, great difficulty may be experienced in locating and removing the primary source of the peritoneal infection. Rarely in the author's experience has the appendix been the cause of tuberculous peritonitis. Tuberculosis of the ileocæcal coil, especially of the hyperplastic type, is often accompanied by tuberculous peritonitis which as a rule is limited to the immediate vicinity of the primary disease, and the removal of the involved bowel promptly cures. This is equally true of localized tuberculosis of the small intestine.

In a considerable number of cases of peritoneal tuberculosis confined to the region above the transverse colon, the lesion was particularly marked in the vicinity of the gall-bladder and the pyloric end of the stomach. In several of these cases the gall-bladder, which had shown cholecystitis, was removed and the patients were cured.

The possibilities of the cure of tuberculosis of the peritoneum by simple laparotomy, when the local focus cannot be discovered and removed, are limited to the ascitic forms of the disease. It may at least be said that an open operation with careful removal of all fluid, with or without medication, has therapeutic value. It would seem, however, that the surgical profession has been over-enthusiastic in its praise of the simple operation. The fibroplastic types are benefited only if there are sacculations containing fluid, but operation is contra-indicated when the adhesions fill the entire abdomen without collections of fluid or if the collections consist of multiple small pockets filled with turbid tuberculous exudate containing a mixed infection. Operation in these cases with separation of adhesions is of little value and often results in intestinal fistulæ. Fortunately the adhesion type of tuberculosis of the peritoneum giving rise to the swollen, hard or "wooden" abdomen is most favorable for spontaneous cure.

Urrutia, L.: Diaphragmatic Hernia of the Stomach (Hernia diafragmática del estomago). *Arch. españ. de Enfer. del apar. digest.*, Madrid, 1918, i, 5.

Urrutia reports a case of diaphragmatic hernia in a man of thirty-five years. He gave a history of having been stabbed in the chest four years before. Operation was done by the abdominal route following the Bevan technique. The greater part of the stomach, the omentum, and the transverse colon not including the splenic angle had herniated through an old diaphragmatic orifice. All the herniated organs were held firmly by adhesions to the surrounding parts. In this case the history and the physical findings suggested the diagnosis of diaphragmatic hernia which was verified by an X-ray examination after a test-meal. The man recovered.

Giffin in 1912 collected 650 cases of diaphragmatic hernia, in only 15 of which was a correct diagnosis made during life.

The author discusses the reasons why the thoracic route has been preferred by most authors in operating for diaphragmatic hernia. It has been to a great extent due to German surgical teaching. In America, however, Bevan has recommended the abdominal route except in certain cases. The author prefers this route as more rational and less traumatizing, not requiring resection of a single rib nor collapse of a lung. He was decided in adopting this course by reading Balfour's case of traumatic hernia of the stomach and colon published in the *Annals of Surgery*, January, 1917, operated upon by the abdominal route in which reduction was made without the least difficulty.

The author used the ample incision of Bevan, maintaining the diaphragm tense by means of strong traction on the left costal border with a wide retractor and employing the "pedal" needle devised by Chaput. Heavy chromic catgut was used.

W. A. BRENNAN.

Bland-Sutton, J.: Ganglion Neuroma of the Mesentery. *Lancet*, Lond., 1918, cxciv, 429.

The author reports a case of large abdominal tumor in a boy of ten which was found to be encapsulated between the layers of the mesentery. It was as large as a cocoanut and firm and yellowish like a uterine fibroid, but soft in the center. Microscopical examination revealed nerve-cells and medulated nerve-fibers throughout the soft core and the more firm cortical portion.

The literature describes ganglion neuromata in connection with the adrenals but there was none in this instance. Ganglion neuromata are more common in children than adults, and in the mesentery during childhood and adolescence are always benign.

Ganglion neuromata of the adrenals are malignant and contain disseminating undifferentiated sympathetic neuroblasts; they are called neuroblastomata. Some ovarian and testicular teratomata contain nerve tissue indistinguishable from the gray matter of the brain. The majority of such are innocent, but some display malignancy. It is not improbable that these are embryomata in which the neuroblastic tissue predominates.

P. W. SWEET.

GASTRO-INTESTINAL TRACT

Wilensky, A. O., and Thalhimer, W.: The Etiological Relationship of Benign Ulcer to Carcinoma of the Stomach. *Ann. Surg.*, Phila., 1918, lxvii, 215.

In this study an effort was made to ascertain whether a microscopical study of a series of benign and malignant ulcerations of the stomach would throw any light on the subject of the relationship of ulcer to carcinoma. There were difficulties encountered in that there is a lack of experimental means for causing chronic gastric ulcers in animals.

Forty-eight ulcerated lesions of the stomach were studied. This includes 39 chronic ulcers, 7 ulcer-like carcinomatous lesions, 1 ulcer with regional carcinomatous lymph-nodes, 1 mixed lesion resembling an ulcer, but with carcinoma at many places on its periphery. There were also studied 5 gastrojejunal ulcers and two healed ulcers.

The following conclusions are drawn:

Absolute proof has not been furnished that carcinoma of the stomach can arise in a pre-existing ulcer. Evidence has been submitted which indicates in all probability that in one specimen out of the forty-eight there is present a carcinoma arising in an ulcer. It is fair to presume that in 1 to 2 per cent of ulcerated gastric lesions the morphological microscopic evidence indicates that carcinoma has arisen in an ulcer.

The majority of ulcerated gastric lesions are either simple chronic ulcers or definite carcinomata. Any etiologic relationship of gastric ulcer to gastric carcinoma cannot be traced in these specimens.

Ulcerated gastric lesions which appeared benign grossly were proved by the microscope to be malignant in 18.7 per cent of the cases studied. It is impossible to state whether they represent an ulcerating carcinoma or an ulcer which has undergone malignant transformation.

C. A. BOWERS.

Woolsley, G.: The Surgical Aspects of Gastric Hæmorrhage. *N. Y. M. J.*, 1918, cvii, 395.

The cause of gastric hæmorrhage may be in the stomach or outside. Hæmorrhage from gastric ulcer is not so frequent as often supposed and hæmorrhage *per se* is of little value in the diagnosis of ulcer. The correct diagnosis of the cause of the hæmorrhage is made in less than half the cases.

The cases of gastric hæmorrhage curable by surgical operation are those due to chronic ulcer and carcinoma and to diseased conditions of the appendix, gall-bladder and spleen.

Operation should not be done during profuse hæmorrhage. Such cases should be treated medically and operation done when the patient has sufficiently recovered, if chronic ulcer is suspected. In cases of repeated hæmorrhages, operation should be done before the patient becomes profoundly anæmic.

Transfusion may be life-saving. It may check hæmorrhage alone, or make the patient an operable risk.

Gastro-enterostomy is the simplest and safest operation, but alone or even with pyloric exclusion is not an absolutely certain cure. Excision or resection should be added if the conditions are favorable. One should not be tempted to do too much.

If there is no ulcer, the appendix, gall-bladder and spleen should be explored with a view to removal if pathological.

C. A. BOWERS.

Araya, R.: Dyspepsia Due to Perigastritis (Dispepsias por perigastritis). *Rev. méd. d. Rosario*, 1918, viii, 15.

The author gives the clinical history of 4 cases, in 3 of which he did a laparotomy with destruction of perigastric adhesions, and in the fourth case

accompanied by a gastro-enterostomy. Brilliant results were obtained in all cases. These were old cases diagnosed as dyspepsia gastralgia, malignant tumor, etc., which had been treated for years by various medical means with only temporary improvement or no results.

The author thinks that whenever clinical examination clearly establishes the existence of perigastric adhesions, or when the failure of medical treament necessitates a laparotomy which reveals the existence of perigastritis, there should be a careful removal of all new-formed adhesions so as to restore normal motility of the stomach. This in most cases will definitely cure the stomach troubles. When the adhesions are thick and resistant and normal motility of the stomach cannot be assured, a gastro-enterostomy should be added. W. A. BRENNAN.

Field, M. T.: Gastroduodenal Perforation; a New Diagnostic Sign. *Boston M. & S. J.*, 1918, clxxviii, 220.

The author discusses the diagnosis of gastroduodenal perforation, citing several cases. He concludes that:

1. The diagnosis of perforation of the stomach and duodenum must many times remain in doubt unless aided by some distinctive and reliable sign, independent of parietal peritoneal irritation and tension.

2. In every case of perforation, gas and fluid are present in varying amounts in the free peritoneal cavity. The gas may pass between the liver and diaphragm, as shown by the X-ray and cause obliteration of liver dullness.

3. Much dependence cannot be placed on liver percussion as ordinarily practised because of the very great variations, both in health and disease.

4. Change of the patient's position will cause the fluid to flow to the dependent part and the air to rise to the top. This will intensify the findings: tympany over a wide liver area and again flatness over the same area on change of position.

5. Normally there is a change in the liver percussion note on change of posture. This was noted in a large number of normal cases examined, but in none of these were the results similar to those found in the cases reported. Normal liver changes must be recognized before positive deductions are made. A fair comparison is the difference detected in shifting dullness in the flank due to moderate ascites, and in the normal abdomen.

6. The author believes that this sign is of considerable value and should be sought for in every case. If absent in the presence of other positive signs of perforation, it may be disregarded, but if present in doubtful cases, it may be the deciding diagnostic factor. H. H. FREILICH.

Stewart, F. T.: A Method of Permanent Gastrostomy. *Tr. Am. Surg. Ass.*, Cincinnati, 1918, June.

A rectangular flap of skin is raised from the epigastrium and sutured around a catheter. The lower end of the dermal tube thus formed is sutured to the margins of an opening which is made in the anterior wall of the stomach. The lower half of the dermal tube is buried by inversion sutures in the gastric parietes, the upper extremity of the canal so made in the gastric wall being sutured to the parietal peritoneum. The rectus is sutured around the upper half of the dermal tube and the cutaneous incision closed. The method has all the advantages of providing a canal lined by epithelium, without the disadvantages inherent in the procedures which supply a canal lined with mucosa.

Margarit, F.: Perforation of the Duodenum and Formation of a Large Intra-Abdominal Cyst (Caso de perforacion del duodeno y formacion de un gran quiste intra-abdominal). *Gac. méd. catal.*, Barcelona, 1918, lii, 121.

The author relates the case of a man dying after severe hæmatemesis and enterorrhagia. At the autopsy a large cyst was found in the abdomen. The anterior and external part of the cyst was formed by the abdominal wall; posteriorly it was limited by the peritoneum covering the right kidney; superiorly by the lower face of the liver. Internally the cyst showed a partition starting from the anterior face of the stomach and large mesentery and terminating in the anterior abdominal wall. The transverse colon shared in enclosing the cyst, which contained from four to five liters of a dark sedimentary fluid. The stomach, having been opened in its anterior face, showed the same dark coloration of the cyst. The pylorus and neighboring parts were massed together by thick adhesions. In the first part of the posterior duodenum a perforation a few centimeters long was found which communicated with the cavity described.

It appears that the liver acted as a tampon in a prior ulcer of the lesser curvature of the stomach, and the ulcerous process continuing farther down, it terminated by the perforation which at length caused the patient's death.

The author discusses the pathological conditions giving rise to abdominal cysts from the perforation of gastric ulcers. Such an occurrence is very rare.

W. A. BRENNAN.

Northrop, H. L.: A Pair of Artery Forceps in the Intestinal Tract for Four Years. *Hahneman. Month.*, 1918, liii, 86.

A woman, aged thirty-six, presented herself complaining of pelvic discomfort. She gave a history of having had two operations performed in 1908 and 1913 for the removal of a pelvic tumor and for oöphorectomy. She was constipated and bowel movements were very painful; she had seen blood in her stools. By external examination a nodular movable tumor was felt in the lower abdomen to the right of the median line. Vaginal examination revealed the presence in the upper part of the rectum of a pointed, metallic object, presumably a pair of forceps. X-ray examination disclosed a pair of

artery forceps, the rings or handle being directed upward and the jaws being directed downward.

On opening the abdomen the two blades of the forceps were contained within the lumen of the sigmoid colon, while one ring was situated in the cavity of the cæcum and the other projected through the ileocæcal valve into the ileum. It was now evident that a short circuiting anastomosis had been performed between the cæcum and the sigmoid when she was previously operated upon, for there were the blades of the forceps projecting through the anastomotic opening. When the cæcum was opened anteriorly, the forceps were seen surrounded by a considerable quantity of hard, fæcal matter.

The patient's recovery was rapid and complete.

EDWARD L. CORNELL.

Twyman, E. D.: Non-Rotated Ileum with Fatal Intestinal Obstruction Due to Occlusion of the Ileum by the Over-Riding Colon. *J. Am. M. Ass.*, 1918, lxx, 672.

The author reports a case of anomalous relation of terminal ileum, cæcum, and ascending colon.

The relations are described in detail, differing from normal in that the ileum in its lower 30 inches passed behind the posterior parietal peritoneum, and then from a point 2 inches below the hepatic angle of the colon passed down lateral to the colon, around the cæcum, and entered the ileocæcal valve in the usual way. A Meckel's diverticulum in the course of this lower ileum showed evidence of former inflammation. Fibrous bands crossing the ileum in its retroperitoneal portion caused intestinal obstruction.

The case report describes a chronic obstruction, an unrelieved acute attack of which led to operation.

The possible causes of the unusual relations and the acutely obstructed state are discussed, and the following classification of non-rotation cases is given:

1. Non-rotation complete, of both large and small bowels.
2. Non-rotation, partial or incomplete, of both bowels.
3. Over-rotation, with pelvic position of cæcum and appendix.
4. Mal-rotation, causing the colon to assume an abnormal relation to certain organs or membranes.
5. Non-rotation of a portion of the small intestine with the remainder normal.

The case reported necessitates the fifth group, being the first case reported of this character. The case supports the theory of the possibility of inflammatory adhesive processes in the peritoneum.

V. E. DUDMAN.

Melchior, L.: Appendicitis and Foreign Bodies (Appendicitis e lorpore alieno). *Nord. med. Ark.*, Stockholm, 1917, i, Kirurgi, No. 15.

The author investigates appendicitis where the infection is believed to be induced by injury to the mucous membrane or the entire wall by a foreign body which has entered through the mouth. Apart from animal parasites and from fæcal stones, and considering only dead substances entering by the mouth, surgical literature most frequently mentions needles, pins, fishbone, pieces of glass, buttons, fruit pits, etc., as the kind of foreign body found in the appendix.

As regards frequency, statistical reports of operations by various authors show that foreign bodies in the appendix are found in a proportion varying from 0 to 7 per cent. In 400 appendices examined in the author's pathological institute, foreign bodies of dead matter were found 8 times, or 2 per cent.

As regards the mode of entrance of foreign bodies into the appendix, the author mentions one point particularly, namely, dislocation of the appendix downward, particularly when it is contained in a hernia.

The author discusses the probability of appendicitis being caused by the presence of a foreign body, and is of the opinion that on the average a foreign body in the appendix is rather an uninjurious phenomenon.

W. A. BRENNAN.

Desmarest: Rectal Palpation in Cancer of the Rectum (Du toucher rectal dans les cancers du rectum). *Arch. d. mal. de l'appar. digest.*, Par., 1917, ix, 361.

Desmarest calls attention to the frequency of cancer of the rectum and of the large intestine, 50 cases of which he has seen within three years. Such cancers may remain unrecognized for a long time. Desmarest thinks that in order for such patients to be benefited by surgery, very early diagnosis is necessary; he finds this can be effected by rectal palpation, which unfortunately is very often neglected by practitioners.

Rectal cancers may be divided into two large classes: (1) that class of cancers entirely or almost entirely explorable by rectal palpation, of which this method permits a perfect investigation because it determines their situation, and the degree of invasion, points which are sufficient to enable the surgeon to decide the course to follow. Rectoscopy is here only an accessory procedure which may be used when needed in certain cases, such as the removal of a fragment of tumor. The cancers which come within this category are cancers of the anal canal and cancers of the lower half of the rectal ampulla. (2) That class of cancers hardly accessible by rectal palpation, for which it gives only very incomplete indications, and for the investigation of which rectoscopy must be relied on. Such are cancers of the upper part of the rectal ampulla and cancers of the rectosigmoid region.

Desmarest gives details of his method of rectal palpation. He prefers lateral decubitus, the lower limb being extended and the upper flexed. It is necessary to become thoroughly expert in distinguishing between the different sensations in order to differentiate between a tumor of the

prostate or seminal vesicle in man, or a uterine or adnexal complication in a woman. The mode of occurrence of a rectal cancer and its physical features give distinct characteristics and can be recognized by expert palpation. The rectoscope cannot be introduced in a lumen narrowed by a tumor without danger. Neither can it give the surgeon indications as to the height or extent of the lesions; a laparotomy alone can inform him in such cases.

The author thinks that rectal palpation is indispensable in the case of any patient who shows signs of enteritis or bleeding from the rectum. In a later paper the author will give the results of his surgical interventions in cases of rectal cancer.

W. A. BRENNAN.

Barnes, R. H.: Should the Sphincter Muscles Be Divided? *Interst. M. J.*, 1918, xxv, 46.

Since 1913 the author has not divided a sphincter muscle in the treatment of anal fistula and has become more enthusiastic over his success in obtaining drainage without dividing these muscles. If the sphincters are not involved, it is a simple matter to lay open the skin overlying the tract in order that drainage may be obtained.

When the sphincters are involved, the incision should be in the direction of the muscle fibers rather than in the direction of the spoke of a wheel to the anus. By the use of submucous dissection, drainage can be obtained from the inside of the sphincters. If necessary, the opening can be extended completely around the sphincter without dividing it.

An abscess located in the superior pelvirectal space can be drained by following up the opening at the anus. without going through the ischiorectal space. The perineum is the most difficult region from which to obtain drainage without injury to the muscles, because the muscles center from so many directions. Packing these wounds for twenty-four hours will produce considerable separation and a better opening for drainge. By this method of not dividing the sphincter muscles there is less danger of incontinence and less deformity. E. B. FREILICH.

LIVER, PANCREAS, AND SPLEEN

Mayo, W. J.: The Liver and Its Cirrhoses. *J. Am. M. Ass.*, 1918, lxx, 1361.

The liver is the central metabolic laboratory of the human body responsible for the final preparation of nutritive material for conversion into tissue-building and energizing substances.

The portal system is made up of the gastro-mesenteric veins and the splenic vein, and it should be noted that the normal splenic vein carries to the liver from one-eighth to one-sixth of the total quantity of portal blood. The enlarged spleen has vessels in accordance with its size. The large spleens in certain splenomegalies may have vessels the size of the superior mesenteric artery and vein. This is most important, as it indicates that removal of the spleen relieves the liver of a large load of blood and, as shown by the results of splenectomies, this diversion to the general circulation may be sufficient to relieve the subnormal liver of its overload and enable the patients to return to a fair degree of health in otherwise fatal cases. Splenectomy establishes a new principle of treatment, namely, a reduction instead of a diversion of portal circulation, as accomplished in the experimental Eck fistula and the Talma Morrison operation. The stomach and rectum have each a double vascular circulation, portal and systemic, and ligation of the portal vessels of these two organs may have a field.

The liver has five chief functions:

1. The glycogenetic function of the liver is most important in the final conversion and storage of carbohydrate derivatives in a form from which energy is most readily produced.

2. The amino-acids from protein digestion, of which 18 have been described, are carried to the liver by the portal vein and a considerable part of the nitrogen-containing portion of the molecule is converted into urea. The amino-acids are used to repair tissue waste as well as to supply energy.

3. The fat function of the liver is not well understood. It is known that sugar and fat are stored temporarily in the liver, ready for immediate use. It is probable, under certain circumstances, that carbohydrates are converted into fat in the liver. In acute stress such as occurs in phosphorus and chloroform poisoning, and massive infections, the liver may undergo a most rapidly fatal fatty degeneration. Its usual response to destructive insults appears to be acute fatty degeneration. In these first three functions, namely, the metabolism of carbohydrates, proteins and fats, the liver completes a process started in the gastro-intestinal tract. In the next two, the bile and defense functions, the spleen is associated with the gastro-intestinal tract.

4. The bile pigments are derived from destroyed red corpuscles carried to the liver, partly from the spleen. The latter view agrees with the known results of blood transfusion in the anæmias. When enormous quantities of blood are destroyed, as in hæmolytic icterus, the liver as well as the spleen becomes greatly enlarged, a condition that has been confused with biliary cirrhosis. The enlargement may be looked on as hypertrophy due to overwork with hyperplasia of the liver cells.

5. The defense function of the liver is very important. Bacteria are constantly being carried to the liver from the portal circulation. At times these bacteria pass through to the bile-ducts and gall-bladder, causing infections. The spleen strains out many bacteria, as in typhoid fever, and protozoa, especially the plasmodium of malaria and the spirochete of syphilis; but it is unable to destroy these organisms and they are sent to the liver for destruction. The interrelated pathologic condition of the spleen and liver follows closely this interrelation of function.

Cirrhosis is a term applied indefinitely and indiscriminately to almost any condition of the liver which is not understood, but in which there is an excess of connective tissue. The outstanding feature of all liver changes, the result of chronic irritation, without regard to cause, is the deposit of connective tissue. This is well shown in the local cirrhotic processes which may accompany cancer, syphilis, and tuberculosis of the liver. The two types of cirrhosis are:

1. Portal cirrhosis, in which the chronic irritants, probably biochemic substances, are introduced through the portal vein, and in which circulatory disturbances are the most prominent clinical features, causing gastric hæmorrhages, and especially ascites. Jaundice is seldom present and only as a terminal symptom.

2. Biliary cirrhosis, in which jaundice is clinically the chief symptom, ascites being absent or if present being a terminal condition, with the evidence pointing to an infectious cause. In portal cirrhosis the connective tissue is introduced about the radicles of the portal vein, and in biliary cirrhosis, about the bile-ducts. In both portal and biliary cirrhoses the spleen is often enlarged and has a causative relation in many cases such as the terminal portal cirrhosis of the splenic anæmias, the so-called Banti's disease.

The large majority of cases that have taken the term of Hanot's cirrhosis are either hæmolytic icterus or the ordinary type of biliary cirrhosis. As a matter of fact, hæmolytic icterus, primarily a splenic disease with hypertrophy of the liver, has been confused with biliary cirrhosis and, as gall-stones with recurring exacerbations of infections existed in 60 per cent of the cases in which the spleen was removed for the cure of hæmolytic icterus, this confusion has not been entirely without excuse. If it is constantly borne in mind that, without regard to the nature of the irritant, the response in the liver is connective-tissue formation, and that this may involve the whole liver with typical symptoms or that it may exist locally, with few or no symptoms, it may readily be seen where confusion has arisen. While typical portal cirrhosis, on one hand, and typical biliary cirrhosis on the other, are well defined, atypical forms exist from mixed causes, such as portal cirrhosis with secondary biliary cirrhosis from gall-stone infections.

Better understanding of the atrophic type of portal cirrhosis has led to an underestimation of the frequency with which the cirrhotic liver is increased in size and weight. In biliary cirrhosis the liver is usually enlarged and is undoubtedly the late stage of a more frequent infection of the liver ducts which in most instances recover or develop only localized areas of biliary cirrhosis without increase of the size of the liver or jaundice. Chronic hæmatogenous infections of the gall-bladder and ducts usually with gall-stones are the most common cause of these local mild cirrhotic processes. The pancreas is often involved in the chronic inflammatory process. Transient icterus may or may not be present.

In five cases of portal cirrhosis with ascites in which the enlarged spleen was removed, the four patients who recovered were greatly improved both as to their general condition and the relief of the ascites. The results in these cases should encourage splenectomy in suitable cases of portal cirrhosis in the future, especially when the spleen is enlarged.

Biliary cirrhosis of the obstructive or acutely infective type is easily understood. It exists in connection with gall-stones, particularly those in the common duct, and jaundice is an early and continuous feature. Many of these cases, however, are not cured by the removal of gall-stones and biliary drainage. In five cases of this type, in all of which the spleens were enlarged and the patients more than thirty-five years of age, splenectomy was performed.

The confusion which has arisen between biliary cirrhosis and hæmolytic icterus has somewhat of a parallel in the failure to differentiate those ascites due to multiple serositis (Concato's disease) and portal thrombosis from portal cirrhosis.

Bevan, A. D.: A Case of Choledochoplasty and the Demonstration of an Overlooked Common Duct Stone. *Surg. Clin. Chicago*, 1918, ii, 49.

Bevan reports a case of choledochoplasty in a patient who six months previously had been operated upon for stricture of the common duct. At the time of the first operation gall-stones were found in the gall-bladder, but none in the cystic or common ducts. She had had a rather typical history of repeated attacks of gall-stone colic, but never associated with jaundice or with any symptoms pointing to obstruction of the common duct. At the time of operation, because of the extensive disease of the gall-bladder, it was thought best to do a cholecystectomy. This was done with some difficulty on account of the adhesions and at the close of the operation, when the surgeon was ligating the cystic artery, a severe hæmorrhage occurred which was difficult to control. Finally it was controlled by crushing a considerable piece of tissue containing the vessel in a pair of forceps and ligating *en masse*.

In forty-eight hours the patient developed symptoms of common duct obstruction, as shown by the presence of jaundice. The surgeon, feeling that he had probably injured the common or hepatic duct with the ligature or clamp, opened the laparotomy wound, divided the ligature that had been used in controlling the hæmorrhage and removed it in the hope that the obstruction to the common duct would be removed. Within a few days bile poured out of the external wound and the woman went on to a fairly good recovery.

The biliary fistula persisted for months and finally an operation for restoring the continuity of the common duct was proposed. At this operation the ends of the divided duct were found and the cross-piece of a T-shaped tube introduced into the hepatic duct above and down into the common

duct below. The shank of the T-tube was brought out externally, so that the bile could run into the dressings. The jaundice was relieved at once. The tube was left in for months and finally removed, with the hope that a permanent canal had been established which could carry the bile into the duodenum. At the last operation the operator tried to introduce a tube through the common duct into the duodenum, but was unsuccessful as the tube would not pass through the constructed papilla. After removal of the tube the jaundice returned intermittently and finally became persistent, and the patient was referred to the author for treatment.

At his operation Bevan found the omentum adherent to the liver, stomach and duodenum. At the right free fold of the gastrohepatic omentum a little tube was exposed, which was the common duct. On dividing the common duct no bile was found and it was evident that the liver had ceased to secrete bile because of the great intrahepatic pressure produced by the stricture.

To restore the common duct he passed a No. 12 catheter from the common duct to the duodenum, carrying one end up into the hepatic duct for about half an inch and stitching it to the outer edge of the hepatic duct with two fine linen sutures. The other end was carried through the lower part of the common duct into the duodenum, so that five or six inches of the catheter remained in the duodenum. He then closed part of the incision of the common duct over the catheter. For a considerable distance this could not be done, so he covered the defect in the common duct with a piece of omentum.

The patient made a very satisfactory recovery and the jaundice rapidly disappeared. X-ray pictures taken at the end of four weeks showed the tube still in position.

In connection with this case Bevan reports one in which a common duct stone was found at autopsy but had been overlooked at operation.

The patient had been operated upon twice previously and when brought to Dr. Bevan was suffering from jaundice due to an obstruction of the common duct. At operation dense adhesions were found about the liver, stomach, duodenum, transverse colon and omenum. At the location of the common duct an abscess containing pus and small irregular flakes of material resembling cholesterol were found. The patient was in such bad condition that the abscess was simply drained. Three weeks later she died from cholæmia and the development of a duodenal fistula.

At postmortem an opening was found in the duodenum probably at the point where the second surgeon had made an anastomosis between the hepatic duct and duodenum. The common duct was patulous throughout. There was no stricture or carcinoma, but at the junction of the right and left hepatic ducts and blocking up the beginning of the common duct entirely was a small stone.

The moral which he draws from these two cases is: first, the importance of doing cholecystectomies with very free wide incisions, so that the cystic duct and cystic artery can be completely exposed when they are ligated without carrying any risk of injury to the hepatic or common duct; and second, the importance of examining the common duct and hepatic duct for stones and removing them at the same sitting.

He says that reconstruction of the common duct for carcinoma has had a very narrow field and the operation is necessarily palliative and should be either a cholecystenterostomy where possible, or a cholecystotomy where there is difficulty and the condition of the patient does not warrant prolonged operation. G. W. HOCHREIN.

Benjamin, A. E.: An Accessory Pancreas with Intussusception. *Ann. Surg.*, Phila., 1918, lxvii, 293.

Kemp states that an accessory pancreas is a mass of pancreatic tissue, entirely separate and having its own duct; it may assume the functions of the main organ when that is diseased and may cause diverticulæ and herniæ of the wall of the intestines. Opie reports ten cases in 1,800 autopsies, those lying above the pancreas in the duodenum and stomach, and those in the duodenum and jejunum. They have been found in the ileum, in an umbilical fistula, in the mesentery, and in fat of the great omentum.

The pathological changes affecting accessory pancreatic tissue are fat necrosis, and chronic interstitial inflammatory and malignant growth.

An accessory pancreas may sometimes be a causative factor in the production of diverticulum of the intestine by exerting continuous traction on the intestinal wall during development. If the swelling protrudes into the lumen of the bowel and attains a considerable size, it might produce obstruction, or it might cause an intussusception.

Warthin reported 49 cases in 1904. There are 17 cases reported of an accessory pancreas in the jejunum.

The author reports a case of an accessory pancreas with intussusception. This patient was aged thirty-nine. There was severe pain in the lower abdomen and for two months previous to operation it was localized in the right upper quadrant; this pain started in the right side and moved toward the umbilicus. For two months there was vomiting, at first every week and later every two or three days. Emesis had been from one to two quarts, containing no blood, and dark green and bitter. Stools were black for three months.

Exploratory operation revealed an intussusception of the upper part of the jejunum. This was reduced and found to contain a tumor-like mass involving the jejunum. Because of the condition of the patient resection was not done, but a lateral anastomosis was made around the growth. The patient died five days after the operation and autopsy showed the presence of an adenoma of an accessory pancreas. C. A. BOWERS.

Pacini, A. J. P.: Splenectomy in Splenomegalies. *Ann. Surg.*, Phila., 1918, lxvii, 299.

Splenectomy was first done in 1549 for malarial splenomegaly by an Italian surgeon, Zaccvello. Very little was done from this time until 1826. In 1908 Johnston reported upon 708 splenectomies.

Splenomegaly deals with an inherent increase in the volume of the spleen, exclusive of certain pathological entities, such as abscesses, parasitic cysts and impactions incident to acute infective processes, and those chronic intoxications and circulatory disturbances which occasion "amyloid" and "cardiac" spleen.

Splenomegaly deals with: (1) infantile splenomegalic anæmia; (2) the Griesinger type of splenic anæmia; this is a large spleen, with enlarged liver and lymph-nodes without leukæmia; (3) Banti's disease; (4) Vaquez's disease, characterized by splenomegalia, anæmia and cyanosis; (5) Gaucher's type of splenic anæmia; there is a discussion as to whether this is a true splenic tumor (endothelioma), or a generalized hæmatopathy with splenic localization; (6) chronic splenomegalic hæmolytic jaundice; (7) leukæmia and pseudo-leukæmia; (8) pernicious splenomegalic anæmia; (9) primary tuberculosis of the spleen; (10) splenic syphilis; (11) malarial spleen; (12) infection with Leishmann's spirillum.

Splenectomy is indicated in: (1) Banti's disease, particularly the first stages; (2) Griesinger disease; (3) chronic splenomegalic hæmolytic icterus; (4) primary splenic tuberculosis; (5) hereditary splenic syphilis after medication fails; (6) chronic malaria, attended with splenomegaly.

Splenectomy is of questionable value in: (1) splenic infantile anæmia; (2) pernicious splenomegalic anæmia; (3) Gaucher's disease.

Splenectomy is contra-indicated in: (1) splenomegaly incident to leukæmia and pseudo-leukæmia; (2) splenomegaly of kala-azar. C. A. Bowers.

MISCELLANEOUS

Smith, F. H.: Acute Abdominal Pain in Children. *Virg. M. Month.*, 1918, xliv, 533.

The author discusses acute abdominal pain as a symptom induced by slighter stimuli in children than in adults.

Acute appendicitis and intestinal obstruction are the great abdominal emergencies of childhood; their important diagnostic points are discussed.

Ureteral spasm incidental to infection of the upper urinary tract may confuse, in the absence of a routine investigation of the condition of the urine.

Abdominal pain in children should always cause suspicion to be directed toward possible pulmonary involvement. V. E. Dudman.

De Forest, H. P.: Abdominal Injury Due to Blunt Force; Difficult Diagnosis. *Am. J. Dis. Child.*, 1918, xv, 273.

The case was that of a girl, four years old, who fell over backward while on a hobby horse, the saddle striking her directly across the abdomen at the unbilical level. The only immediate effect was slight pain and tenderness over the right lower ribs. On the afternoon of the second day following the accident, the temperature rose to 103.5°. Examination at that time excluded injury to the intestines, liver, gall-bladder, or kidney. The tentative diagnosis was either injury of an abnormally placed appendix or a hæmatoma of the abdominal wall.

The next day the acute symptoms had subsided. One week later a mass was found lying below the free border of the ribs on the right side. This mass was very tender and painful and was thought to be the liver, either abscessed or containing a new-growth, or an encapsulated hæmatoma. The mass rapidly increased in size, and there was cardiac and respiratory oppression with progressive anæmia.

On the thirty-sixth day following the accident an exploratory laparotomy was done. The liver was found to be normal but entirely displaced by a large mass, which when opened was found to contain serum, blood and clots, and a few soft pale-gray masses resembling sarcomatous tissue of the small round-celled type. This mass proved to be the right kidney entirely disorganized and broken down, the tumor wall being the kidney capsule. The kidney was drained and packed.

Autopsy examination showed a slight loss of cortical substance from the kidney and a contusion of the kidney capsule, allowing a slow but progressive hæmorrhage to take place beneath and within the capsule. I. W. Bach.

SURGERY OF THE EXTREMITIES

DISEASES OF THE BONES, JOINTS, MUSCLES, TENDONS, CONDITIONS COMMONLY FOUND IN THE EXTREMITIES

Berg, A. A., and Thalhimer, W.: Regeneration of Bone. *Ann. Surg.*, Phila., 1918, lxvii, 331.

A series of experiments was performed on cats. Autogenous grafts from the tibia were transplanted on the costal cartilage after the perichondrium had been removed; a few were transplanted into the substance of the spleen, and a few subcutaneously. All transplants showed new bone formation. These transplants were then studied microscopically.

The following conclusions were arrived at:

Periosteum, devoid of adherent bone-cells, when transplanted into foreign tissues produces bone. Endosteum and osteoblasts lining haversian canals and the cambium layer, when adherent to trans-

planted cortex, all produce bone. Some of the newly formed bone-cells live for nearly a year but most of the bone is absorbed. Fully developed bone-cells, though they may remain alive for a long time, do not reproduce themselves to form new bone. Very young lacunar cells can reproduce themselves and form bone. Transplanted bone is absorbed not only by osteoclasts, but also by the direct action of growing young bone, and the transplanted bone is replaced by the extension and growth of new bone into the transplant. Marrow spaces and hæmatopoietic marrow are formed in the bone which develops from transplanted periosteum. The source of the hæmatopoietic cells was not determined.

LISTER TUHOLSKE.

Dodd, V. A.: Periosteal Sarcoma of the Clavicle. *Ohio St. M. J.*, 1918, xiv, 141.

The largest and most important group of sarcomata originate in the osseous system. From a collection of 797 cases of osseous sarcoma it was found to occur most frequently in the jaw and least frequently in the clavicle.

Because of the similarity of early sarcoma to mild inflammatory disease, and its rapid spread through the blood stream, its early diagnosis is imperative.

A definite history of trauma is frequently obtained but its relation to the growth is sometimes questionable. Pain or swelling first brings the patient to the physician. Examination at this time reveals a fusiform, immovable, hard enlargement near the epiphysis. The mass is not very tender to pressure, but the patient complains of deep-seated, dull, boring pain. In the slower growing type the periosteum may give rise to a thin layer of bone which imparts an egg-shell crackling and reveals the condition on X-ray examination. In all types the X-ray is a valuable aid. Whether or not surgical measures can be employed, Coley's toxins should be used. As in the series of 797 cases, only 3 occurred in the clavicle. The author reports a case.

I. E. BISHKOW.

Barrie, G.: Fibrocystic and Cystic Lesions in Bone. *Ann. Surg.*, Phila., 1918, lxvii, 354.

Fibrocystic and cystic lesions in bone, which are non-neoplastic, are divided into two groups. Group 1 includes all multiple lesions in a single bone, single lesions in numerous bones, and multiple lesions in several bones. These lesions are all due to some general systemic disturbance. The main etiological factors are (*a*) metabolic processes, (*b*) syphilis, (*c*) tuberculosis, (*d*) other bacterial infections, (*e*) parasites, (*f*) hæmophilia.

Metabolic processes are due to interference with the function of endocrine glands. In this sub-class are included osteitis fibrosa cystica and osteitis deformans.

The congenital more often than the acquired form of syphilis frequently shows localized cystic or fibrocystic areas in the cancellous bone.

Group 2 includes solitary cystic and fibrocystic bone lesions arising independently of those associated with neoplasms. Seventy-five per cent are due to bone trauma following direct injury, dating back months or years. They are usually painless. In cases of pathological fracture, X-ray of the entire skeleton often reveals fibrocystic lesions in other bones, as well as at the site of fracture.

A series of X-ray plates extending over a period of several months is of the greatest value in diagnosis differentiating between different members of Group 2.

Treatment of the solitary lesion consists of thorough curetting and swabbing with tincture of iodine for stimulative regenerative effect. All cavities larger than a pigeon's egg are filled with shavings taken from adjacent bone, to shorten the process of repair and cure.

V. E. DUDMAN.

Platou, E.: Osseous Cysts and So-Called Giant-Cell Sarcoma. *Ann. Surg.*, Phila., 1918, lxvii, 312.

Osteitis fibrosa with giant-cell tumor is a benign disease and as such should be distinguished from giant-cell sarcoma. Osteitis fibrosa occurs chiefly in the young adult; trauma is the usual etiologic factor. A slow inflammatory process of the bone ensues. Slowly the bone swells, causing rheumatic pains; fibrosis of the medullary tissue follows with rarefying osteitis and cyst formation. The walls of the cyst are usually smooth and seldom penetrate the periosteum. The bony wall may be so thin as to crackle on palpation. The roentgenogram is of great help frequently. A sarcoma usually shows periosteal changes.

The treatment is exclusively surgical, but conservative. When there is a cyst, with serum-like contents, remove the serum, scrape the walls, and push in the shell. Preserve the periosteum as this will form callus to fill up the cavity. During the scraping, profuse bleeding may occur, so an Esmarch band is to be used. If the cyst is so large that removal causes the bone to break, bone grafting or ivory stick may be resorted to. Microscopic examination of the excised tissue does not always determine the diagnosis.

LISTER TUHOLSKE.

DeMata, R.: Interscapular Thoracic Amputation (Amputation interescápulotorácica). *Rev. clin. de los hosp.*, Madrid, 1918, iii, 129.

The indications for interscapular thoracic amputation are usually sarcomatous tumors on the upper humeral extremity or involving the scapula and soft peri-articular tissues. Kawamura's statistics of 315 cases compiled in 1910 showed that sarcoma was the cause in about 60 per cent of the cases. Operation may be called for in severe traumatisms, extensive burns, etc. The mortality is relatively slight, not exceeding 3 per cent.

The author reports 4 cases, carried out according to classic technique, one a personal case, and the other 3 communicated by Vigueras. The author's case was in a man about thirty years old, and

Vigueras' cases were in females aged twenty-one, twenty-six and sixteen years respectively. All showed regional sarcoma. The four cases recovered, but there has been recurrence in one.

W. A. BRENNAN.

Cotton, A., and McCleary, S.: Roentgenograms of a Case of Myxoma of the Femur. *Am. J. Roentgenol.*, 1918, v, 195.

The text accompanying a number of roentgenograms describes the lesion as follows:

The whole shaft of the femur from neck to condyles was involved in the pathological process. There was enlargement of the bone with rarefaction and thinning of the outer compact bone. The rarefaction was not uniform; some areas were more marked than others. The contour of the bone was irregular on all surfaces. At the middle of the bone an area about three inches long and involving one-third of the circumference was shown where bone had been removed by operation. Along the shaft of the bone, especially at the site of a previous operation, were numerous small projections of new bone extending outward from the periosteum in different directions.

The operative findings are also given, together with the pathologist's report. ADOLPH HARTUNG.

Tenani, O.: Causalgia and Its Surgical Treatment (La causalgia et il suo trattamento chirurgico). *Policlin.*, Roma, 1918, xxv, sez. prat., 125.

Tenani reports two cases of causalgia occurring in the lower limb following war wounds, which he treated by perivascular sympathectomy as recommended and practiced by Leriche in war surgery since 1916.

The pathogenesis of causalgia appears to be rather complex; it may be provoked by isolated or variously combined lesions of either the nerve-trunk or of the perivascular sheath or of the vessel itself. Leriche assumed that the origin of causalgia was in the sympathetic contained in the peri-arterial sheath, and that consequently denudation of the sheath and freeing of the artery would cause the disappearance of causalgia. This he found to occur in several cases which he operated upon late in 1916 and early in 1917.

Tenani has obtained a similar result in the 2 cases operated upon by him. But sympathectomy as practiced by Tenani differs from the technique followed by Leriche in his operations. Leriche strips the artery alone, whereas Tenani also strips the vein. The reasons for this are both technical and clinical; clinical because it permits the whole of the vascular sheath to be removed with more certainty. The removal of the perivenous sheath by producing dilatation of the vessel and diminishing the endovenous pressure facilitates and increases the effect of the modifications in the circulation provoked by the resection of the peri-arterial sympathetic.

According to Tenani perivascular sympathectomy is the method of choice in causalgia. The number of cases and clinical results are still too few, however, to express any dogmatic opinions concerning it.

W. A. BRENNAN.

FRACTURES AND DISLOCATIONS

Mitchell, H. C.: Fractures of the Pelvis and Resulting Injuries to the Urethra and Bladder. *Illinois M. J.*, 1918, xxxiii, 107.

Sixty per cent of pelvic fractures are complicated by injury to the urethra or bladder or both.

Symptoms of pelvic fracture may show no deformity; there will be shock, manifested by pallor, an anxious expression of countenance, feeble pulse, cold clammy skin, weak voice, and insecurity on the injured side when attempting to stand, usually with some outward rotation of the limb. Deformity may be obscured by extravasation of urine in the tissues.

An X-ray should be taken, as sometimes the injury is mistaken for a dislocated hip, and in manipulating the bowel, the bladder or urethra may be wounded. If there is no deformity, no attempt should be made to reduce the bones. If urine is extravasated into the scrotum, perineum or over the abdomen, this should be immediately relieved.

Rectal examination should always be done. The patient should be moved carefully and placed on his back on a firm mattress or fracture bed; if more comfortable on the side, he should be allowed to assume that position. The legs should be drawn up and supported on pillows. The patient should be kept on his back for four weeks and in bed for six weeks. The bowels are evacuated on a rubber sheet and not elevated to a bed pan.

In ruptured urethra it is often necessary to do a retrograde catheterization in order to find the end of the urethra nearest the bladder.

It is important to make a suprapubic incision, because it enables one to find the torn ends of the urethra; it tells exactly where to make the perineal incision with the least invading of tissues; it shows whether the bladder is torn or injured, and if any urine is extravasated; any rupture of the bladder is visible; the ends of bones may be better replaced.

C. A. BOWERS.

Serra, A.: Critical Review of the Treatment of Gunshot Fractures of the Long Bones (Riassunto critico su la cura delle fratture delle ossa lunghe da proiettili di guerra). *Chir. d. organ. d. mov.*, Bologna, 1917, i, 493.

Serra writes from the Rizzoli Orthopedic Institute of Bologna. He thinks that the open fractures of war differ very much from those of peace. Formerly he considered that orthopedic methods could not be adapted to war wounds, but he has changed his opinion.

The factors rendering war fractures different from the common fractures of peace are: (1) multiplicity of wounds; (2) the type of injury caused by gunshot; (3) secondary and late hæmorrhage; (4) shock; and (5) infection.

In the general consideration of the repair in fractures the author verifies a fact which was well known to older surgeons, that the periosteum of the different long bones have not an equal regenerative power; if extensive portions of the humerus are easily and rapidly replaced after a subperiosteal resection, smaller losses in the ulna and tibia even in closed fractures cause rebellious pseudarthroses.

The author dwells on the difficulty of obtaining immobilization in the field service formations. He shows the disadvantages and advantages of the fixed plaster fenestrated apparatus, and discusses various types of splints, the use of which is fully described and illustrated.

Serra thinks that neither plaster immobilization nor traction of a particular or general type are sufficient to cure war fractures. Each case calls for individual treatment according to the wound, the region, the place and time of treatment.

The author discusses the details of treatment in the field and rear hospitals. He strongly advocates immobilization and extension, using splints of the Thomas type and fixing the bone fragments.

Clinical histories of more than 40 cases, a few treated by plaster apparatus, the majority by continuous traction, are given and illustrated. These fractures were mostly produced by bullets and therefore were not of the most severe type with suppuration and soft part lesions; but the skeletal injuries were however very severe. They were generally unaccompanied by associated lesions, wounds of the vessels, nerves, etc. Many of the cases had come to the Institute well immobilized with accurate approximation of the fractured fragments, and to such excellent early treatment the later very satisfactory results of the orthopedic treatment are partly due.

Only two functional and anatomically bad effects have been obtained, and in both cases were due to infection. W. A. Brennan.

Sneyd, G. C.: Remarks on the Treatment of Fracture of the Lower Limb. *Lancet*, Lond., 1918, cxciv, 524.

Many of the fractures that have come under the observation of the author have been old on arrival and exhibited grave deformity due to one or more of the following conditions: (1) complete displacement; (2) compound fracture with sepsis; (3) extensive comminution; (4) loss of bone; (5) presence of a foreign body; (6) faulty splinting, mainly insufficient extension.

The treatment resolved itself into dealing with sepsis and correction of deformity.

Sepsis is chiefly caused by inadequate drainage or lack of extension, or else by the presence of a foreign body or sequestra in many cases. Various antiseptics have been used in combating sepsis but mechanics and judicious operative intervention with the production of drainage and extension are more important than chemistry in these cases.

Extension alone helps drainage by preventing pocketing of pus and allowing freer circulation; however, vigorous extension may lead to secondary hæmorrhage. Too free removal of comminuted bone is not advisable, as it may lead to considerable shortening.

The treatment in an early stage should be that of keeping the sinus or wounds clean while the limb is splinted in the most suitable position with extension, leaving free access for dressings to be applied.

Although many new forms of treatment have been introduced, fomentations remain one of the most useful remedies against sepsis. In sepsis good results follow a very minute dose of autogenous vaccine. The author has seen great benefit from the use of sulphur and glycerine. They are mixed until a creamy consistency is formed, and the wound filled with this cream; a fomentation of three or four layers is then applied around the wound, above and below it, surrounded by protective tissue and wool. This is not touched for forty-eight hours. "Bipp" is of great value and appears to lessen reaction after operation.

An X-ray in two planes should be taken before, during, and after treatment. When sepsis is well established it may be unwise to interfere with deformity. If the case is a recent one, sepsis would be greatly diminished by extension.

A great many recent cases can be set in accurate position by splints or plaster of Paris. A great deal depends upon the site of the fracture, its nature, and whether one bone only is broken, as in the leg. The condition as shown by the X-ray calls for more than the mere setting of the fracture; it demands as accurate a reposition as is possible, and the maintenance of the reposition.

It is often impossible to replace the fractured ends in cases one month or more old, muscles having contracted to such an extent that traction is of no value.

The more bone plating one sees, the more is one impressed by the futility of trying to reduce deformity by traction in cases of any duration. Callus is only noticeable by its absence in a large number of these cases of complete displacement, even after the period of one or two months. Bone plating in these cases insures the most accurate apposition of the fragments. Trauma during the operation is conducive to sepsis. Where a plating operation has been done, it is usual to allow the cases up in a Hoefftcke's ambulatory splint within one month after operation, the slight amount of strain involved stimulating callus deposition. In transverse fracture of the tibia alone, open manipulation is sufficient without plating, and in these cases traction is futile.

The author has frequently used the Thomas splint, but has always applied weight extension. He has also used the Hoefftcke war splint for fracture of the lower limb. This splint is of great service; it is telescopic and the upper flanges for counterextension

are adjustable, so that any case can be fitted accurately and comfortably without any pressure on the pubic bone or perineum. When union has progressed, the splint should be taken off and the knee- and ankle-joints moved occasionally to insure good joint function. Lateral deformity can be greatly improved even in quite old cases by applying lateral tension with rubber tubing. V. C. HUNT.

Gray, O.: Fracture of the Humerus Complicated with Musculospiral Paralysis. *J. Arkansas M. Soc.*, 1918, xiv, 220.

The author reports two cases of fracture of the humerus where there was a complication by reason of injury to the musculospiral nerve.

He desires to call attention to the necessity of making a thorough examination of the mobility of the fingers before the fracture is reduced and the patient anæsthetized. If this complication is found, a satisfactory explanation can always be made. E. C. ROBITSHEK.

Mayet, H.: The Treatment of Elbow Fractures in the Child (Contribution à la thérapeutique des fractures du coude chez l'enfant). *Paris chirurg.*, 1917, ix, 595.

After having adopted the habitual method of reduction and immobilization in flexion of elbow fractures in young patients, Mayet has been struck by the real difficulties which he met in order to restore the integrity of functioning of the elbow-joint after the removal of the immobilizing apparatus. He therefore commenced his treatment by trying reduction in extension. It seemed to him infinitely superior.

At the end of ten days the elbow is placed in flexion. This second procedure is perfectly easily accomplished. After a second period of immobilization in flexion, the limb being again set free, Mayet has been surprised to observe that articular functioning was constantly effected with extreme ease and that total recovery of movement was very rapidly obtained. The method is simple; it is easily applied. Reduction in extension is particularly easy when the amount of displacement is not great, when assisted by radiographic control.

He has operated in 35 cases. Eighteen of these were supracondylar transverse fractures; 8 were fractures of the internal condyle with greater or lesser participation of the trochlea; 7 were epitrochlear fractures; two were fractures of the upper part of the radius. In the 18 transversal fractures all have recovered the normal movement of the elbow; in 5 for some months extreme flexion was impossible. Two of these later seemed to have recovered full flexion. The 8 condylar fractures gave satisfactory results within a month after the withdrawal of apparatus. The epitrochlear and radius fractures have given completely satisfactory results.

Mayet considers that his results are much superior to those obtained from the method of plaster cast in flexion. W. A. BRENNAN.

Doyle, E. C.: The Treatment of Fractures of the Elbow-Joint. *J. So. Car. M. Ass.*, 1918, xiv, 67.

If the skin is broken the author uses 3 per cent iodine for cleansing, instead of soap and water. Iodine should not be used after the water, as the latter causes the cells to become œdematous and the iodine does not penetrate.

If there is nerve injury, these are united by bringing axis cylinder to axis cylinder, sheath to sheath, etc. If the olecranon is stripped of tissue, it is imperative that it be covered with normal skin with its underlying connective tissue, otherwise there will be trouble in flexing the joint.

If there is much swelling, one should wait until this subsides before tampering with the joint. This may be aided by bandages or by using evaporating lotions. Pain about the elbow may be due to an inflamed bursa and not to the joint itself.

The author follows the method of Jones, of Liverpool, in putting fractures up in acute flexion, instead of at 90 degrees. He then uses massage and passive motion later. C. A. BOWERS.

SURGERY OF THE BONES, JOINTS, ETC.

Taylor, J., and McLeod, A. G.: The Operative Correction of Deformity in Gunshot Fractures. *Lancet*, Lond., 1918, cxciv, 405.

Two classes of fractures are treated at Cambridge Hospital, Aldershot: first, simple fractures among men under military training; second, gunshot fractures from forces overseas. The simple fractures are first put in extension and if good alignment is not obtained in two weeks, an open operation is done. The two types of fractures usually requiring open operation are spiral fractures and fractures near a joint. If operation is delayed even a month, too much callus forms and the unapposed ends become rounded off; but, most important of all, the bones have become rarefied, and if one end of the fracture is short, the screws do not hold well enough to assure a good result even with plating. In all open operations the Lane technique is carefully followed. Neither the gloved hands nor anything which has touched them is placed in the wound. Everything is done with instruments.

In gunshot fractures the question of lighting up a latent infection has to be considered. As soon as such come under observation, the increase of the nutrition of the limb is first considered. Massage, hot air baths, and electrical treatment is started and in this way scars are relieved, induration and œdema cleared up, and the mobility of joints improved. If there is any latent infection it will be lighted up by this treatment, and with this as a guide the time for operation can be safely determined. The massage, etc., should be begun lightly and increased in severity and if there is local reaction of swelling, tenderness, and increased local heat, the wound is too active for operative procedure. If no reaction occurs after prolonged passive and then active exercise, operation may be safely performed.

The results obtained are: (1) no shortening in simple fractures and only the degree of shortening in gunshot fractures which is caused by actual loss of bone and necrosis from sepsis; (2) better range in joints than in non-operative cases; (3) much less pain and œdema because of minimum deformity.

P. W. SWEET.

Derache, P.: Primary Osteosynthesis in War Surgery (Note sur l'ostéosynthèse en chirurgie de guerre). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 465.

There are certain fractures for which continuous extension does not suffice because they cannot be reduced with coaptation of the bone extremities. It so happens frequently in leg fractures, particularly thigh fractures. Splintered fractures are also liable to pseudarthrosis, as well as difficulty of coaption. For all these osteosynthesis renders great service.

The author has treated by osteosynthesis 4 fractures of the humerus; 4 of the forearm; 5 thigh fractures; 4 of the leg, and 1 patellar fracture.

For the osteosynthesis he used either metallic sutures or Lambotte's or Lane's plates. The Lambotte plate is preferred for the upper limb and the Lane plate for the lower. The plate method he thinks is infinitely better than metallic suture which never gives a complete immobilization of the fragments and there is always some displacement later. For after-treatment he always uses a Thomas splint and the limb is mobilized from the day of operation.

Case reports and illustrative radiographs are given.

The patients reached the hospital in from three to four hours after injury. In 8 cases the osteosynthesis was done on arrival. In 9 it was done in from three to fifteen days after injury and sterilization of the wound, and in one case somewhat later than fifteen days. In 10 cases the soft parts were primarily sutured, in 1 case secondarily, and in 7 not sutured.

In the majority the progress was apyretic. All functional results were excellent. W. A. BRENNAN.

Churchman, J. W.: The Treatment of Acute Infections of the Joint by Lavage and Direct Medication. *J. Am. M. Ass.*, 1918, lxx, 1047.

Preliminary cleansing of the lining membrane of a joint must be effectively accomplished before antiseptics can be expected to reach and penetrate the cells of the lining.

An apparatus is described as a device by means of which a joint may be mechanically cleansed and diffusable antiseptics may be applied in direct contact with the cells of the synovial membrane. This is done under local anæsthesia.

Dilute solutions of gentian violet, applied either directly to the bodies of certain organisms, or to the medium on which they are grown, has been shown to possess a selective bactericidal action. Gram-positive organisms will not grow in the presence of the dye; Gram-negative organisms are unaffected.

This property was considered in the treatment of a series of eight infections of the knee.

The apparatus is fully described with illustrative cuts, and consists of a series of interconnecting chambers, all leading to a single tube, which is attached to an aspirating needle for insertion into the joint. The system is entirely closed so that rigid asepsis may be maintained. It is essential that the aspirating tube be as large as one-half a centimeter in diameter, that bits of mucus and fibrin may pass through.

The skin is anæsthetized and the trocar inserted into the joint. The infective fluid is first withdrawn, and preserved for study.

Next, novocaine is forced into the joint cavity to the point of distention. This is withdrawn, and salt solution forced in. This is used for irrigation, until it returns clear. Peroxide is then forced in, and following this salt solution is used for washing until it returns clear. The joint is now filled to distention with gentian violet 1:1,000, and left for five minutes. This is then withdrawn and a small amount of a 1:10,000 solution introduced and allowed to remain.

Of the eight cases, two were pyogenic, five gonorrhœal, and one of unknown etiology.

From a study of the results of treatment of these cases, conclusions can be drawn that apyogenic or gonorrhœal infections of the synovial membrane of the knee can be cured by this method.

It is possible that this treatment may be applied to the pleural cavity, and to the kidney pelvis.

Experiments with pyorrhœa alveolaris have given cause for belief that a direct injection of gentian violet into tissues may prove effective.

V. E. DUDMAN.

Barnsby, H.: Unilateral Arthrotomy with Total Primary Suture in Wounds of the Knee-Joint (Arthrotomie unilatérale avec suture primitive totale dans les plaies articulaires du genou). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 388.

In January, 1917, Barnsby reported a series of knee-joint wounds treated successfully by arthrotomy followed by immediate total closure. Since then, he has modified his method by substituting unilateral arthrotomy in wounds with important epiphyseal lesions. He now reports 20 such cases with details.

There are three contra-indications to unilateral arthrotomy: (a) in important lesions of the tibial articular surface; (b) in total comminutive fractures of the patella; (c) in fractures in which an included projectile cannot be extracted by the lateral opening. In these three cases the larger arthrotomy is indicated in order to see clearly and act quickly. In all other cases, especially in a smashed condyle or half of the patella, the unilateral procedure suffices and is infinitely less mutilating and less damaging to the joint.

While early operation is best, good work can be done within the first twenty-four hours. While the position of the orifice is a guide, the radioscopic

examination showing the position of the projectile indicates the site of the lateral incision. The incision should be at least 1 cm. behind the edge of the patella, and about 4 to 5 cm. long to allow exploration and removal of foreign bodies, etc. If an important condylar lesion is found, the incision can be enlarged and sufficient light obtained by using retractors. The knee should be put in flexion. If there is a bicondylar lesion, the U-arthrotomy with tendon section is probably best. An extensive loss of substance can be filled with pieces of cartilage, but this might very well be omitted. A good provisory hæmostasis by compressing for five to ten minutes will suffice and Barnsby has never observed any complication such as a hæmarthrosis, necessitating punctures. The primary suture, after ether bath, is made preferably in three planes without drainage.

Although he previously upheld immobilization for 21 days, Barnsby has now joined the majority of surgeons who commence mobilization as soon as the sutures are drawn. Flexion at a right angle has been obtained by the twentieth day in nine-tenths of the cases. The men treated by unilateral arthrotomy without section of the patellar tendon mobilize their joints much more easily and complete recovery is more quickly obtained. W. A. Brennan.

ORTHOPEDICS IN GENERAL

Hazen, H. H.: Syphilis of the Joints. *Virg. M. Month.*, 1918, xliv, 537.

About twenty per cent of all syphilitics have some joint involvement. The pathology is due to the treponema pallidum.

The diagnosis is made by looking for other signs of syphilis. Treatment consists of intensive mercury and salvarsan administration.

Types recognized in both acquired and congenital forms are: arthralgia, with intense pain but no demonstrable pathology; synovitis, with red, swollen joints and intense pain; hydro-arthrosis, with a sudden effusion into the joint, but no fever or tenderness; osteochondro-arthropathies, due to gummata, usually appearing in the ends of the bone; Charcot joints, usually ascribed to trophic disturbances, but which the author believes are amenable to syphilitic therapeutics, since he has found evidence of bone syphilis. John Mitchell.

Ashley, D. D.: Shoes, Physiological and Therapeutic. *N. Y. M. J.*, 1918, cvii, 433, 498.

The author considers shoes from a physiological and therapeutic standpoint. The physiological shoe should conform to the normal foot when in action. The therapeutic shoe is intended to correct or relieve the affliction of the feet and should conserve all the points of the physiological shoe.

The anterior foot is often deformed. Metatarsalgia, sensitive anterior arch, callosities, inflamed sesamoid bones of the great toe; all occur by the forward thrust of the foot in an ill-adapted shoe. Such a foot requires a physiological shoe, one with added toe room, a heel lower than usual, a metatarsal elevation. Often the heel becomes sensitive in low-heeled shoes. The sensitive heel requires a shoe so fitted as to hold the heel cushion under the calcaneus.

Another distressing condition is the painful flattened heel. This condition is relieved by a heel one or two inches high, with a thick piece of felt under the tender area.

Deformities such as ingrowing toe-nails, clubbed toes, over-riding toes, hallux rigidus are the result of the pressure of wedged-toed shoes, and to the pressure of short shoes. Mild deformities are corrected by plenty of toe room in the shoe. Attention must be given to exercise of the intrinsic muscles. Bunions, hallux valgus and inflamed great toe-joints are treated by making the shoe snug posterior to the ball, with a straight inner vamp. The sole may be elevated one-eighth to one-fourth of an inch on the inner side to relieve pressure on the great toe-joint.

To relieve bunions and corns on the little toe, and the extremities of the fifth metatarsal, a rebalancing of the shoe is necessary.

Painful weak feet with no deformity are due to muscular weakness and loss of tone. These feet require physiological or therapeutic shoes, and exercises to strengthen the entire muscular and nervous system.

Pronated feet require control of the calcaneus, a snug counter to grasp the heel, or a physiological heel seat with a moderately broad heel, to aid in preventing deformity. The heel may be flared or extended on the inside.

The painful rigid foot is closely related and associated frequently with arthritic conditions. The author believes that this deformity has been frequently mistreated. The surgeon uses a brace, the physician medicates. Too little attention is given to the etiological factor present. When of recent origin, it is corrected easily by manipulation and strapping. When of long standing, the rigid foot offers great difficulty to treatment even under anæsthesia.

John Mitchell.

Wade, R. B.: Re-Establishment of the Crippled. *Med. J. Austral.*, 1917, ii, 452.

Happily a large proportion of the men will be able to overcome their disability by the use of suitably directed treatment. In most cases the cause of the extreme disabilities may be laid to sepsis. During a long period of healing, muscles waste and joints stiffen to an extraordinary degree, and deformities arise that are quite unavoidable. There is a condition of atrophy and complete loss of power due only to disuse which simulates a true paralysis. Prolonged immobilization in splints is a frequent cause. The various deformities may be due to the shortening of some of the muscles, with overstretching of the opposing muscles.

Massage and proper apparatus may relieve the condition to a marked degree. In performing nerve suture the muscles must be held relaxed until union has taken place, as a stretched muscle will never regain its tone. In joints where ankylosis is anticipated, the limb should be held in the most useful position for ankylosis. The elbow should be fixed at 90 degrees where the occupation is to be clerical, and 110 degrees where the labor is to be manual. The shoulder should be ankylosed at 60 degrees.

As to operative measures to correct deformity, the chance of a latent infection should be borne in mind, and operation not attempted too early. The after-care consists of judicious massage, the whirlpool bath, and vocational training. These measures must be kept up vigorously and continuously; the results are usually excellent. J. J. KURLANDER.

SURGERY OF THE SPINAL COLUMN AND CORD

Derache, Gosset, and Bonome: Wounds of the Spinal Cord (Blessures de la moelle epinière). *Arch. de méd. et pharm. mil.*, Par., 1917, lxviii, 453.

Reports on war injuries of the spinal cord were submitted by the authors to the second Interallied Surgical Congress in May, 1917. Gosset had observed 200 such during twenty months and could operate in only 45 cases. These interventions were late laminectomies when there was not complete section of the cord. There was only 1 death. The most important points in order to secure benignity of the operation are: (1) hermetic closure of the dural sac when it has been opened; (2) very careful reconstitution of the muscular planes by a regular myoplasty; (3) omission of all drainage.

Bonome who has seen 300 cases finds that in the majority of cases the projectile reaches the cord in the posterior and lateral region of the spine. Penetration through the abdominal or thoracic route is not frequent.

In operating in order to lessen the gravity of the operation, Bonome limits the opening of the spinal cavity to lateral laminectomy. This allows easy exploration of the cavity and its contents and even of the side opposite the laminectomy. The operative results have always been satisfactory. With this method an immobilizing vertebral apparatus is unnecessary. Lateral laminectomy is very applicable in war wounds of the spine.

According to Bowlby, the indications for surgical operation are:

1. Displaced osseous fragments compressing the spine or irritating the nerve roots.
2. A projectile in the interior of the vertebral canal compressing the cord or lodged in one of the bundles.
3. Symptoms due to pressure caused by hæmorrhage between the meninges and the bony canal.
4. The relief of intolerable suffering.
5. Operation may be indicated at a late period although an early intervention may not be desirable.
6. Injury of the nerves of the cauda equina.

The Congress concluded that from the therapeutic point of view it is necessary to distinguish two distinct classes of spinal cord lesions: (a) those in which there is a complete section of the cord, in which case surgery is powerless; (b) those in which there is compression due to a projectile, a bone chip, by osseous displacement, or a meningeal hæmorrhage.

In the majority of cases a primary operation must be avoided. In the Italian army, in the case of osseous compression or a projectile embedded in the canal, they have adopted the principle of operating as early as possible in order to remove the projectile, particles of clothing, etc., and free the cords and veins. The mortality of these early operations is very high. They also prefer unilateral laminectomy.

Secondary operation will be done after recovery of the scars.

From the point of view of end-results there is an absolute distinction between lesions of the cord itself and those situated in the cauda equina.

W. A. BRENNAN.

Roux, S.: Anterior Sacral Meningocele (Contribution à l'étude de la meningocèle sacrée antérieure). *Rev. méd. de la Suisse Rom.*, 1918, xxxviii, 47.

The author gives an historical review of spina bifida, distinguishing between occult spina bifida and cystic spina bifida. The author finds only 12 cases of typical anterior spina bifida in literature, and gives short histories of these.

Particulars are given of a personal case in a male child aged eight years. In this case preliminary treatment by iodide injections failed, and the cavity was excised with obliteration of the communicating opening, closing it with several layers of catgut sutures. The author used the subumbilical laparotomy incision. This is recommended rather than the perineal or parasacral route not only for reasons of asepsis but because liberation of the tumor is easier and resection of the coccyx and sacrum is not necessitated. The child recovered and left the hospital in good condition in less than a month.

The study of this case and those reported in literature enables the author to draw conclusions regarding the following points:

1. The possibility of making a pre-operative diagnosis.
2. The rarity of anterior spina bifida.
3. Its relatively favorable prognosis.

4. The influence of a traumatism or of a pregnancy on the tumor.

5. The rather late appearance of symptoms of compression on the bladder and rectum. The case reported by the author was the only one in which this was observed in the patient from the time of birth.

6. The rarity of nervous symptoms before any operation.

7. The frequent absence of concomitant malformations.

8. The apparent greater frequency of the malformation in females. The author's case is the only one reported in a male. W. A. BRENNAN.

SURGERY OF THE NERVOUS SYSTEM

Symns, J. L. M.: A Method of Estimating the Vibratory Sensation, with Some Notes on Its Application in Diseases of the Peripheral and Central Nervous System. *Lancet*, Lond., 1918, cxciv, 217.

Symns has worked out a method by which the impairment of the vibratory sensation could be estimated as a numerical ratio. He uses a tuning-fork with a vibration-rate of 108.75. Two pieces of steel are attached to the upper portion of the fork in such a manner that when the arms of the fork are vibrating, a small window is seen between them. This disappears when the vibrations of the fork reach a definite amplitude.

At the moment when the window disappears, he applies the fork to the subcutaneous bony points and starts a stop-watch. The patient is instructed to give a signal at the moment when he ceases to appreciate the vibrations. The watch is then stopped and the time recorded.

The bony points taken are the internal and external malleoli, tibia, anterior-superior spine of the ilium, sacrum, sternum, radius and ulna. By applying this method to thirty normal individuals between the ages of eighteen and thirty he found what interval of time elapsed before sensation disappeared and used this as guide in his study.

Diminution in the vibratory sensation will be found in cases of peripheral neuritis due to alcoholism and diabetes before the loss of the ankle-jerk, which in turn is before the knee-jerk. He considers this of great value as a method of foretelling the danger of peripheral neuritis. In tabes dorsalis the vibratory sensation is found to be diminished first over the lower limbs, and second over the sacrum.

The reason for choosing bony points for the application of the stimuli is that the bone acts as a sounding board, transmitting the sensation to a variable distance around. G. W. HOCHREIN.

Ball, C. R.: Tic Douloureux and Its Treatment. *Minnesota Med.*, 1918, i, 91.

Tic douloureux is a definite clinical entity, occurring chiefly in patients with a neuropathic predisposition. It is practically never caused by focal infection in the teeth, tonsils, sinuses, etc., consequently treatment of some existing infection does not afford relief.

Many patients give a history of having or having had migraine or epilepsy. Most of them have had surgical operations on supposed sites of infection with no relief resulting. The pain of tic douloureux has distinguishing features; it is paroxysmal, beginning and ending suddenly. It is never continuous. In most cases, the pain is started by impulse, coming from a certain area in the region of the face, hypersenstitive gums, lips, nose, etc. These areas are called "trigger zones" by Patrick.

The treatment consists in injecting alcohol into the infected branch of the nerve or into the ganglion as indicated; the nerve supplying the "trigger zone" should also be injected. Alcohol injections afford relief in all cases for a considerable period of time. LISTER TUHOLSKE.

Bramwell, E.: Gunshot Wounds of the Peripheral Nerves, with Reference to the Indications for Resection and Suture. *Edinb. M. J.*, 1918, xx, 147.

The indications for resection and secondary suture of a peripheral nerve are not always clear. There is great difficulty in diagnosing the type of nerve lesion. A nerve may be completely or partly divided; it may be contused; it may be compressed from without or constricted by a scar. Complete division is comparatively rare.

If the paralysis was not simultaneous with the wound, division of the nerve may be excluded. When a nerve is superficial, direct palpation is important; it may reveal a breach in continuity, a localized neuroma, etc. Complete loss of function is not an indication for operation until there is clinical evidence of degeneration.

The following points aid in the diagnosis of complete interruption, whether anatomic, histologic, or physiologic:

1. Muscles below the seat of injury are completely paralyzed.
2. Paralyzed muscles lose their tone.
3. Affected muscles atrophy.
4. Electrical changes and mechanical excitability of the muscles are present. The reaction of degeneration occurring in a muscle does not mean that the muscle cannot spontaneously recover.
5. Disturbances of sensation in a sensory or mixed nerve occur. There are two disturbances of sensation constantly observed in cases of complete interruption: (a) absence of pain when pressure is

applied to the nerve trunk below the lesion; and (b) complete absence of pain when paralyzed muscles are subjected to pressure.

"Since the clinical signs indicative of complete interruption neither throw light upon the lesion nor upon the probabilities of ultimate spontaneous recovery; since in a certain proportion of cases this applies especially to the first few weeks after the wound and before a neuroma has had time to develop, the appearance of the nerve when exposed by the surgeon may not permit of a definite conclusion as to the advisability of resection and secondary suture; since recovery after this operation is a slow process which is rarely complete; since pronounced spontaneous improvement is often observed; and since a delay of two or three months probably affects but little the rapidity and degree of ultimate recovery after operation, it is generally regarded as advisable to delay the decision as to resection for a period of three months, by which time clinical evidence of regeneration will have had time to manifest itself." LISTER TUHOLSKE.

Hammond, T. E.: The Involvement of the External and Internal Popliteal Nerves in Lesions of the Sciatic Nerve. *Brit. M. J.*, 1918, i, 397.

During the South African war the external popliteal nerve was stated to be involved nine times as frequently as the internal popliteal nerve. In injuries of the sciatic nerve during the present war the proportion is stated to be three to one. Hoffman believed it to be due to the smaller blood supply of the external popliteal, but this is the smaller nerve. The fact that the internal lies more in line with the femoral vessels and that the external is the more superficial cannot account for the disproportion, as the nerves lie side by side and bullets pass in all directions.

The external popliteal nerve supplies muscles which act against gravity and no improvement follows until proper treatment has been applied. The internal popliteal nerve supplies the plantar flexors of the ankle, the small muscles of the foot, and sensory fibers to the skin of the heel and sole, and the action of these muscles is aided by gravity. In complete division but slight deformity is usually present. In incomplete division slight pes cavus may be present with paresis of the flexor muscles and anæsthesia, trophic changes being usually absent.

In the case of incomplete lesion of the internal popliteal associated with a complete or incomplete lesion of the external popliteal, the flexor muscles contract with the aid of gravity in the position of plantar flexion; this relaxes the affected muscles and helps their recovery, even if no treatment be applied.

In lesions of the sciatic nerve admitted to Alder Hey from other hospitals, the external popliteal was affected three times as often as the internal. In 100 cases admitted direct from France in which the wound was in the upper two-thirds of the thigh, the sciatic nerve was involved in 22. The external popliteal was involved in 21, and the internal in 19 cases.

For diagnosis of incomplete lesions of the internal popliteal nerve a most careful examination is necessary, especially if a lesion of the external popliteal be present. The author thinks that the majority of lesions of the internal popliteal nerve are never diagnosed, while lesions of the external popliteal are rarely missed. V. C. HUNT.

Dujarier, C., and François: Twenty Cases of Homoplastic Grafts in Nerve Sections (Sur vingt cas de greffe homoplastique dans les sections nerveuses). *Bull. et mém. Soc. de chir. de Par.*, 1918, xliv, 43.

In cases where sectioned nerve-ends could not be brought together by traction and sutured, the authors have tried grafting. In their first 8 cases autografts were used but did not give satisfaction. In 20 more recent cases they have used homoplastic grafts, the material being obtained from amputations, etc., and preserved in frozen vaseline until required. The nerves to which the grafts have been applied have principally been the radial, ulnar, median, and sciatic. The piece grafted has varied in length from 4 to 12 cm.

The immediate operative results are good. The graft is well tolerated and in no case has it been eliminated. There has been only one case of partial suppuration. It is too early yet to speak of final results but these will be published later.

In all these cases grafting alone offered any chance of restoration of function. W. A. BRENNAN.

MISCELLANEOUS

CLINICAL ENTITIES—TUMORS, ULCERS, ABSCESSES, ETC.

Fleisher, M. S.: Immunity and Tissue Transplantation; the Reactions Occurring About Tissue Transplanted into Heterologous Animals. *J. Med. Research*, 1918, xxxvii, 483.

While the histological reactions which occur about transplanted tissues in normal animals and in immunized animals, and about homologous and heterologous transplants, have been studied by a number of different investigators in connection with transplantable tumors, there have been but few studies made of the reactions taking place where normal tissues are transplanted under similar conditions. Such a study, it seemed to the author, might have a bearing on many immunological problems.

The experiments recorded in his paper were carried out only in rabbits into which pieces of guinea-pig kidney were transplanted. They bear therefore only on the question of transplantation in heterologous animals.

There were striking differences between the histological appearances in the pieces of kidney tissue transplanted into normal animals and those transplanted into immunized animals; furthermore, there were differences in the rate of progress of events.

Considering first the distinctly different features between the normal and immunized, in the former, regeneration of the tubules took place, appearing first at two days and persisting even at twenty-eight days, while in the pieces removed from immunized animals regenerated tubules were not seen at any stage. In these latter tissues there was a very marked leucocytic reaction, and the leucocytes formed an enveloping veil about the tissue which persisted as such for a considerable period, practically up through twenty-one days.

There was less active leucocytic reaction about the pieces in normal animals and there was no distinct leucocytic veil formed about these pieces. On the other hand, the connective tissue reaction about the normal pieces was more marked than about the immune, and the invasion of the tissue by the fibroblasts was much more extensive in the former.

From his study the author draws the following conclusions:

Kidney of guinea-pigs transplanted into normal rabbits remained alive and showed regeneration even at twenty-eight days. No regeneration took place in immune animals.

Leucocytes collected in larger numbers about the transplanted tissues in immune animals than in normal animals. The leucocytes did not, however, penetrate the tissue as rapidly in the immune animals.

The connective tissue formation in normal rabbits was more rapid and more marked than in immune animals. The penetration of the pieces in normal animals by connective tissue cells was also more rapid.

While the differences between the reactions in the two kinds of animals was quite marked, it was not possible to determine the significance of these reactions. Whether serological or cellular reactions played the more important part in the processes, and what their relations were must be left, the author states, for determination by further experiments. GEORGE E. BEILBY.

Castex, M. R., and Queirel, J.: Moist Gangrene in Raynaud's Disease with Paroxysmal Hæmoglobinuria (Gangrene húmeda en un síndrome de Raynaud con hæmoglobinuria paroxística). *Prensa méd. argent.*, Buenos Aires, 1918, iv, 307.

The authors report a case of concomitant Raynaud's disease and paroxysmal hæmoglobinuria in a man of thirty-six years. The right foot showed moist gangrene.

Although the Wassermann reaction was negative, the authors believed syphilis was responsible for both maladies and instituted a vigorous antiluetic treatment. Both diseases yielded; the symptoms disappeared without recurrence, and the patient resumed his occupation.

The authors note that, although there are on record numerous cases of Raynaud's disease and of paroxysmal hæmoglobinuria corresponding with syphilitic infection, yet in the rare cases in which the two maladies were concomitant, syphilis was neither demonstrated nor definitely proved. They think that the rapid disappearance of both symptoms at the installation of antisyphilitic treatment in their own case justifies the clinical diagnosis of the syphilitic nature of this case. W. A. BRENNAN.

Beck, C.: Conservative Surgery in Children. *Surg. Clin. Chicago*, 1918, ii, 177.

Although Beck's article deals directly with the necessity of conservative surgery in children, he brings out the point that it should be practiced on the adult as well and that the war is teaching many lessons in this respect. There are many pathologic conditions as well as injuries which require conservative handling. To strike just the happy medium between radicalism and conservatism is a most important factor and one to be determined by the surgical tact and experience of the operator. Formerly when one had to deal with a tuberculosis affecting the small bones of the wrist, it was believed that there was an absolute indication for amputation. During the last few years through treatment with bismuth injections and X-ray and blue light, surgeons have learned to improve these conditions to such an extent that diseased bones and soft tissues can often be transformed into cicatricial and still useful bridges between the healthy fingers and the healthy forearm, and the same principle applies to knee-joint and ankle-joint affections.

As an example of the use of conservative surgery in children he cites the following case. A boy of ten years was brought to him after he had been under treatment by a good local surgeon for several weeks. The boy had had a septic infection which localized in the joints of the elbows and one foot. The elbow infection was not of such stormy character as that of the foot, where the suppuration took place within the small bones, destroying portions of them, invading the tendon sheath and causing local destruction. Fistulæ necessitated incisions in different directions and the introduction of tubes for drainage, but notwithstanding this treatment the fever continued and amputation was advised.

Beck opened the foot extensively and removed all the necrotic bones, leaving the periosteum wherever it was not detached or necrotic. The cavity was quite extensive and nothing was left of the astragalus, the calcaneus, cuneiform bones, and even adjoining parts of the metatarsal bones were removed. The

greater portion of the metatarsal bones and phalanges were left and also the tendons as far as they had not been destroyed, the dorsal, external and internal malleolar arteries. The whole cavity was packed tightly with gauze and left for granulation. A few days later the foot was put in a permanent bath and the liquid changed frequently. Rapid granulation followed, filling out the cavity inside of a few weeks. The skin wound closed and the foot, though somewhat œdematous, was retained. The boy began to get around on crutches. The fever disappeared and he gained in weight. The foot was somewhat heavy and painful at night and there was no function. An X-ray picture taken a few weeks afterward showed there was some re-formation of bones, calcareous deposits being visible in places where before there had been no bone.

The pains continued and it was suggested that they might be due to some inflammatory condition. It was decided to eradicate the diseased portions of these bones and also the newly formed bone, so as to give the foot another chance to form better and less inflamed bone. This operation was performed by Emil Beck and the foot healed and the pain disappeared. At the time the case was reported the boy was beginning to walk without the aid of a crutch. G. W. HOCHREIN.

Koser, S. A., and McClelland, J. R.: The Fate of Bacterial Spores in the Animal Body. *J. Med. Research*, 1917, xxxvii, 259.

The question of the ability of bacterial spores to remain latent in the tissues of the animal body has received little attention, chief emphasis having been placed thus far on the possibility of tetanus bacillus spores being carried from the point of entry to distant organs and tissues, and after periods of latency developing and producing serious disturbance.

In this study the results of previous investigators were in a large measure confirmed. Spores of bacillus tetani were recovered from the various organs and tissues after the lapse of several months following injection. Data were obtained also as to the fate of the spores of other anaerobes, namely, bacillus putrificus, bacillus œdematis maligni, and bacillus anthracis symptomatici, and of the aerobes, bacillus cereus and bacillus ramosus.

The authors present the results of their investigation in a series of tables. The spores of bacillus tetani, bacillus putrificus, bacillus anthracis symptomatici, and bacillus œdematis maligni were capable of resisting the destructive influence of the body tissues, and were transported from the site of inoculation to different organs, where they remained latent for varying periods of time. The persistence of the spores in the liver and spleen, as well as at the point of entry, the authors found of particular interest. In spite of extreme precaution, contamination was not entirely prevented, as is shown in the tables. The intruding organisms were so few, however, that they did not materially affect the results.

The spores of the aerobic organisms employed showed a marked contrast to those of the strict anaerobes in their deportment after parenteral introduction. In a very few instances only could the spores of the aerobes be recovered from the tissues, away from the site of inoculation.

The authors advance at present no satisfactory explanation of the persistence of viable spores of bacillus tetani and the putrefying organisms in the different tissues, while those of the aerobes, they state, seemed to carry on a precarious existence.

The authors' observations may prove to be of some practical interest in connection with the subject of wound infection, gangrene, and so-called blood poisoning. The results on the fate of the tetanus bacillus substantiate the work of previous investigators, particularly Canfora, Tarozzi and Francis. Similar studies of the gas bacillus, the authors believe, may furnish data of much importance.

GEORGE E. BEILBY.

SERA, VACCINES, AND FERMENTS

Ito, H.: The Fate of Staphylococcus Pyogenes Aureus Introduced Intravenously into Actively Immunized Dogs, and of Killed Bacteria Introduced Intravenously into Normal Dogs. *J. Med. Research*, 1917, xxxvii, 189.

It is well recognized that the natural resistance of an animal against various bacteria can be experimentally increased, and with this there is an increase in the content of opsonin, agglutinin, and bacteriolysin in the serum of such an animal. The present study was undertaken to determine the mechanism, in so far as it could be shown by histological means, by which staphylococcus pyogenes aureus, when introduced into the blood stream, was disposed of by dogs actively immunized against it; and also to determine the disposition of killed staphylococci after their intravenous injection into normal dogs. The author therefore undertook the problem of investigating the site and rate of the disappearance of staphylococcus pyogenes aureus introduced intravenously into the dog previously actively immunized. He performed a number of experiments which he describes in this work in much detail.

From his study he found that bacteria introduced into actively immunized dogs disappeared sooner than in normal dogs and were never found growing in any part of the body.

Bacteria that accumulated in the lungs in the earlier stage were transported to the other organs, but they were not found in the spleen in large numbers, while they were more numerous in the liver.

In certain organs it appeared that both fixed and wandering phagocytes had the ability to engulf, as well as to digest, bacteria throughout all the stages.

As to the fate of killed bacteria introduced into normal dogs, they were destroyed somewhat

quicker than the living bacteria introduced into immunized dogs, and they provoked no changes evident histologically in the tissues.

GEORGE E. BEILBY.

Mosti, R.: The Treatment of War Wounds by Polyvalent Antipyogenic Serum (Il trattamento delle ferite di guerra col siero antipiogeno polivalente). *Policlin*, Roma, 1918, xxv, sez. prat., 251.

Mosti uses a serum prepared in Italy by Lanfranchi and Finzi. This is a polyvalent serum with 23 microbic varieties. It may be injected subcutaneously or endovenously, or applied locally. In any case the wound is first submitted to surgical treatment. The injections are employed in infected wounds.

In wounds with latent infection the use of the serum has almost always prevented the development of the septic process or caused a marked decrease in the virulence. In wounds with positive infection the suppurative process was modified and abbreviated. It cleans up the tissues and brings about early granulation, obviating local and general complications.

W. A. BRENNAN.

BLOOD

Primrose, A.: The Value of the Transfusion of Blood in the Treatment of the Wounded in War. *Tr. Am. Surg. Ass.*, Cincinnati, 1918, June.

The author in conjunction with Ryerson first employed the transfusion of blood in the present war at Salonika in December, 1915, in No. 4 Canadian General Hospital, which was established in tents on the plain at Salonika. During the sojourn of this hospital at Salonika there were some 10 cases in which transfusion was carried out in serious cases of hæmorrhage, the results obtained being most satisfactory; but in one instance hæmolysis occurred, symptoms appearing immediately after 200 ccm. of blood had been transfused. This patient subsequently died.

The author points out that surgeons were tardy in recognizing the value of transfusion of blood as a life-saving measure in cases of hæmorrhage in the wounded. This fact was illustrated by quotations from literature in which, while recognizing that saline infusion is of little value, the transfusion of blood had not been tried to any extent.

In civil practice on this continent prior to the war the immense value of transfusion of whole blood in cases of hæmorrhage was established in hundreds of instances where it had been employed. In the present war the early cases were done by Canadians who had already learned the value of transfusion in civil practice.

The author quotes in detail 2 cases of transfusion by Clutterbuck, a Canadian serving in an Imperial casualty clearing station on the western front. Both patients had multiple shell wounds, suffered from hæmorrhage and shock, and made an excellent recovery after transfusion.

The statistics of Robertson were quoted indicating his experience in 68 cases of transfusion in a Canadian casualty clearing station on the western front. The following analysis may be given of his cases:

1. Primary hæmorrhage. (a) Life-saving (evacuated to base hospital in good condition), 36. (b) Immediately beneficial but died from (1) shock, 8; (2) gas gangrene, 5; (3) capillary bronchitis, 1; (4) pulmonary embolism, 1. (c) No benefit, 4. (d) Harmful (hæmolysis), 2.

2. Secondary hæmorrhage, 9. Of these 6 recovered and 3 died. Of the 3 that died, 1 death was due to hæmolysis following a second transfusion. One died of gas gangrene three days after transfusion. One died of streptococcus septicæmia one month after transfusion.

3. Severe carbon monoxide poisoning, 2.

The casualty clearing station at which these cases were transfused was situated some eight miles from the firing line. The wounded were sent back over very uneven ground, and in bad weather the mud made transportation extremely difficult. In consequence, from six to twelve hours (occasionally as much as twenty-four hours) would elapse before the wounded man reached the hospital. An attempt was made to establish an advanced operating station, but this had to be abandoned because of the enemy shell fire. The delay, the pain and the fatigue consequent upon transportation over rough country increased the shock and collapse. Many of these patients were therefore in extremely bad shape when they arrived in the hospital. Rapid pulse and low blood-pressure were characteristic features presented. The immediate effect of transfusion was to raise the blood-pressure and to produce a slow full pulse. This is shown in the records which were kept of the individual cases and indicates a quick response to the therapeutic measure employed, the immediate beneficial effect being maintained in the vast majority of instances.

Many of these cases were desperate from the outset and it is noteworthy that of 68 cases reported, life was saved in 44 instances, i.e., 64.7 per cent. In other words, the mortality in these cases was 35.3 per cent. This would appear to be a remarkably good showing. It is worthy of note also that an immediate beneficial result was obtained in 15 of the cases which subsequently succumbed to conditions other than hæmorrhage. One is justified in concluding that the transfusion of whole blood practically eliminates the danger of death from hæmorrhage *per se*.

The experience which has been already attained in the treatment of the wounded at the front has been ample to prove the immense value of transfusion in cases of hæmorrhage, both primary and secondary. The author agrees with the conclusions of Archibald and Maclean that transfusion of blood is valueless in shock. However, when shock is accompanied by hæmorrhage, then transfusion has proved of immense value and one may conclude that its employment may turn the scale so that life in

many instances has been saved where shock plus hæmorrhage exists. In fact, one is warranted in assuming that whenever the wounded man has lost large quantities of blood, then the replacement of that blood is the ideal therapeutic measure. Such patients when transfused have the element of danger which exists from loss of blood eliminated. They are in a vastly better position to combat shock, sepsis, or the ordeal of some necessary and perhaps extensive operation or other condition which may threaten life. Transfusion, it is believed, can largely eliminate the danger which exists from hæmorrhage and by replacing the lost blood may materially aid the patient to combat other conditions which might without transfusion prove fatal. Transfusion can place the man in the position of one similarly wounded but who has lost no large amount of blood.

There are mainly two dangers to be avoided in the transfusion of blood: the transfusion of some infective disease, and the danger of hæmolysis. The donor should be carefully examined for the purpose of excluding syphilis or other communicable diseases. The blood of both donor and recipient should be tested in order to determine their iso-agglutinin characteristics. As Ottenberg has pointed out, the most severe and possibly fatal reactions occur when the serum of the recipient agglutinates the corpuscles of the donor, but other conditions of incompatibility, while unlikely to cause serious disturbance, will lessen materially the therapeutic value of transfused blood.

The author was a member of the Interallied Surgical Congress which met in November, 1917, at the French Army Medical School, Val-de-Grâce, in Paris. It was then determined to investigate the value of the transfusion of blood at the following meeting, the subject to be introduced by Tuffier. Accordingly, at the last meeting of the Congress at Paris in March, 1918, this was done. After full discussion it was concluded that the results obtained by the transfusion of blood justify its being looked upon as the method of choice in the treatment of serious hæmorrhage, both primary and secondary. It was agreed that the method of transfusion employed should make it possible to measure the quantity of blood transfused. Regarding the danger of hæmolysis, it was concluded that at advanced posts it is justifiable to resort to transfusion even if it be impossible to test the agglutination, as the risk of serious results is relatively small, but it should be tested in all other units.

The surgery of the present war has been remarkable for the progressive developments which have occurred in the treatment of the wounded soldier. Many of the pet theories regarding the treatment of wounds have been ruthlessly upset and effective and revolutionary measures for the saving of life and limb have been evolved and are today successfully carried out in hospital corps from the front line to the base. For the first time in war the transfusion of whole blood has been carried out successfully and no treatment has been more spectacular or effective as a life-saving measure in cases of hæmorrhage.

Jeanbrau, E.: Technique of Transfusion of Blood Sterilized by Citrate of Soda (Technique simple de transfusion du sang stabilisé par la citrate de soude). *Presse méd.*, Par., 1918, xxvi, 58.

Jeanbrau sketches the history of blood transfusion for hæmorrhage and gives a very detailed description of his own instrumentation and technique for citrated blood transfusions. In the donor the median basilic vein is stripped for a length of 4 cm. The upper end is tied with catgut. A Kocher forceps is placed on the lower end and a small incision is then made in the vein. A graduated ampulla held in the right hand is introduced into the opened vein, the left hand removing the forceps. The correct amount of citrate solution is already in the ampulla. As the blood flows into the ampulla, this latter must be kept agitated so that a thorough mixture of blood and citrate is effected. In the recipient a vein of the arm or the internal saphenous is chosen. Jeanbrau thinks it is a good point to allow the last 2 or 3 cm. drawn from the donor to escape from the ampulla because it may not be sufficiently citrated.

Jeanbrau reaffirms the simplicity and rapidity of his method, as the whole operation can be executed in less than twenty minutes. It may be made at the patient's bed and there is no danger of sepsis. It limits and measures the amount of blood taken from the donor. Jeanbrau has never exceeded 800 cm. except in the cases where donor and recipient were related by blood. The fact that venous blood is used is not objectionable, as a few respirations suffice to oxygenize the injected blood.

From the biological point of view the presence of citrate does not prevent the transformation of hæmoglobin into oxy-hæmoglobin. The citrate solution is not hæmolytic. Jeanbrau cannot find from the results of research that citrate of soda has any harmful action on the products of internal secretion of the vascular glands. W. A. Brennan.

Karsner, H. T.: Transfusion with Tested Bloods, Including the Grouping of One Thousand Bloods and a Method for Use at Advanced Hospitals. *J. Am. M. Ass.*, 1918, lxx, 769.

In this base hospital of about 1,200 beds, transfusion has been practiced forty times with properly tested bloods. In two instances, reactions were noted in the recipients, one being due to a confusion of names of donors, whereby the donor's corpuscles were agglutinated by the recipient's serum, the other being a case in which the recipient's cells were agglutinated by the donor's serum. In both cases the reaction appeared after the introduction of about 50 ccm. of the donor's blood, and the operation was immediately stopped. In neither case was the reaction fatal.

Two methods of testing the blood have been used

in this laboratory. The method of Kolmer was found to occupy a longer time for attaining results than the surgeons considered desirable. The method of Lee was used with great success.

A large list of available donors may be grouped by this method so that when a patient needs a transfusion, his blood may be quickly grouped and a donor selected from the list posted either in the laboratory or the operating theater.

The bloods of 1,000 individuals were subjected to examination by the Lee method, with the results given in Table 1:

Table 1. Classification of blood in 1,000 cases.

	Per cent
Group 1	3.1
Group 2	42.4
Group 3	8.3
Group 4	46.2
	100.0

Granting that Group 4 is the universal donor, the chances of a member of any group having a suitable donor in case the blood is not tested are as indicated in Table 2:

Table 2. Chances of having a suitable donor.

Group 1	493 in 1,000
Group 2	886 in 1,000
Group 3	545 in 1,000
Group 4	462 in 1,000

If the group percentage in each group is multiplied by the favorable chances of that group expressed as fractions of 1,000 and the results added, the total gives the chance of any individual having a successful transfusion, if the bloods are untested. This figure is 649 in 1,000.

For purposes of testing at the casualty clearing station, a team has been sent with this equipment: six microscope slides; six tubes, 75 by 10 mm.; fifty small tubes of Group 2 serum; fifty small tubes of Group 3 serum; one copper wire loop (platinum and aluminum not being available at the moment); one hand lens of 10 X magnification.

This can be packed in a tin such as carries 100 cigarettes and is thus easily transportable. The serum is blown from the tubes directly on the slide, and an equal amount of blood is suspended in physiologic sodium chloride solution, rubbed in with the loop. The slide is inverted, stands at room temperature for ten minutes and the result is read with the hand lens. The loop must be dried with a towel or blotter in going from one serum to the other, but does not necessarily need sterilization. As the serum is exhausted, a new stock can be forwarded, but because of the chance of deterioration when kept at room temperature, it is well not to send too great a stock. EDWARD L. CORNELL.

Kimpton, A. R.: Transfusion; Experiences in over Two Hundred Cases. *Boston M. & S. J.*, 1918, clxxviii, 351.

Transfusion has become a definite surgical procedure and has a very definite place in the treatment of certain medical and surgical conditions as well as in the treatment of certain emergencies. Technical difficulties may be said to have been entirely overcome.

Transfusion is of value in acute and chronic secondary anæmia and in chronic primary anæmia, but not in acute primary anæmia. It is dramatically life-saving in acute massive hæmorrhage, regardless of source. If hæmorrhage is stopped, 800 to 1,000 ccm. are given; if not, as a rule, not more than 500 ccm., lest bleeding be again started by the incident rise in blood-pressure. The indication for transfusion in acute bleeding rests on the general appearance of the patient, the pulse, capillary reaction, hæmoglobin, and diastolic blood-pressure. A diastolic pressure of 50 or below indicates a dangerous condition. A sudden hæmorrhage is of far graver import than a gradual one. In cases of rapid bleeding there may be a period of cyanosis preceding the blanching.

In secondary anæmias, transfusion puts the patient into a condition to receive surgical benefit, whereas without it operation would be very dangerous, if not fatal. Cases of Banti's symptom-complex are often most successfully transfused, either before or after splenectomy.

In hæmorrhage of the newborn, transfusion is specific and nearly every case will recover provided one has not waited too long. Any baby having had a hæmorrhage large enough to show it clinically should be transfused, for such an infant is liable to further bleeding. Sixty to 120 ccm. are usually given in the longitudinal sinus, or the jugular vein in cases of hæmorrhage into the scalp.

In hæmophilia transfusion cures the attack but not the disease. The donor should not be a relative, but even the mother's blood may be used provided the agglutination test is satisfactory.

In uncomplicated shock transfusion theoretically should be of no value. However, such cases with a diastolic pressure below 50 may be greatly benefited. In shock associated with hæmorrhage, if sudden, even though small, transfusion is of great value.

In acute primary anæmia, transfusion is of no considerable value. In chronic primary anæmia it does not cure but prolongs life. If offers as much to the patient alone as splenectomy with or without transfusion. Splenectomy cases later require transfusion; furthermore they do not respond as well to transfusion as do cases not splenectomized. Care should be taken in the amount of blood given for pernicious anæmia, for too much blood may cause plethora and an aplastic state rather than stimulation of the red cell production.

The dangers of transfusion are acute dilatation of the heart, avoided by care in doing the operation,

and anaphylaxis, avoided by blood grouping. The donor should be a healthy, robust, non-syphilitic individual.

The article concludes with a detailed description of the technique, using paraffined glass containers.

C. A. HEDBLOM.

BLOOD AND LYMPH VESSELS

Forgue, E.: Arteriovenous Aneurisms in War Surgery (Les anévrysmes artériosovenieux en chirurgie de guerre). *Rev. de chir.*, Par., 1917, liii, 1.

Forgue points out that arteriovenous aneurisms which were extremely rare in former wars are comparatively frequent in the present war owing to the nature and velocity of the small caliber bullet.

One of the noticeable facts is the systematic tolerance and silence of such a lesion. It is observed that important bivascular lesions involving a trunk artery and its accompanying vein large enough to create permanent anastomosis may exist and give no serious symptoms during a greater or less period of time. This fact should be borne in mind whenever the orifices of entry and exit of a projectile indicate the probability that important vessels have been injured, and should necessitate a careful and detailed systematic examination for the discovery of possible latent vascular lesions.

The operative indications may be determined by the permanency of the arteriovenous communication and the unlikelihood of spontaneous cure. There are plenty of examples in literature of such lesions existing for many years without grave results. But such relative benignity is not constant; it is more usual for such lesions constantly to progress so that the patient is exposed to the risk of a rupture and hæmorrhage. The question then arises, in what cases can a slow or even stationary evolution be hoped for, or when should a rapid progress be expected?

The author thinks that there can be no clinical certainty, and that although it is reasonable to suppose that the simple aneurismal varix without a sac would have a more favorable prognosis than a tumorous varix, yet observation does not show this to be so. In the author's practice, when intervention is practiced, it is determined by the lesion itself and has for its object the suppression of complications inherent to the lesion. The operation is preventive rather than curative of actual disturbances.

Forgue enters at length into a discussion of the choice of methods of operation, reviewing the various procedures. He thinks that the most favorable time for intervention is at the end of the first month. Hæmatomata are then resorbed; the vascular lesions are free from surrounding infiltrations; and hard sclerous perivascular formations which later give the surgeon much trouble are avoided.

Forgue thinks that the essential condition in operating is the complete separation of the arterial circulation from the venous. Any intervention which does not realize this is doomed to failure. Arterial ligature above the site of anastomosis, while it appears the simplest and least dangerous procedure, is in reality that which most compromises the circulation of the limb. Arterial ligature at a distance, double arterial ligature, quadruple ligature, and resection of the arteriovenous segments are discussed in turn.

In order to obtain a guarantee against the reestablishment of intravascular communication, resection of the arterial and venous segments is the only radical procedure. Theoretically, the excised segment ought to be confined to the narrow limits of the anastomosis; but in practice the uncertainty of the exact points of communication and the extent of cicatricial fusion renders an economic excision difficult. Between the two vessels, between the vessels and their sheath, and between the sheath and muscles, extensive dense adhesions are formed which make the intervention quite different from the classic exposure of a vessel. The sound does not succeed in separating the artery from the vein, and it is necessary to use the knife and the scissors freely. The greatest care moreover must be observed in separating the minor regional nerves which run in the perivascular fibrous tissues.

Finally when the vessels are sufficiently exposed over a sufficient area, it must be decided whether the conditions then found call for a bivascular segmental sacrifice with quadruple ligature, or whether the arterial or the venous segment can be preserved. For arteriovenous aneurisms of the axillary, humeral, forearm vessels, and the femoral, especially at its middle third, the dissection is in general easy and is possible anatomically; but in certain other regions, such as the base of the neck, it is difficult to place quadruple ligatures and intervention can only be carried out under risk of serious hæmorrhage.

Forgue refers to the risk of gangrene from the simultaneous ligature of artery and vein, especially of the lower limb. He quotes statistics to show that this risk is high; but the figures, taken from German statistics, are high and incorrectly alarming. One fact however appears clearly, according to experience on this subject, namely, that the lower limb, contrary to the classic belief, well supports complete obliteration of its principal artery and vein over an extended segment; and that paradoxically bivascular resection is less harmful than is simple interruption by a double or quadruple ligature.

The author points out that lateral suture of the arterial and venous wounds is theoretically the intervention of choice, but in practice it is difficult, owing especially to adhesions. The history of this method since Koerte's first success in 1904 is reviewed. If it is impossible to preserve both vessels, an attempt can be made to maintain the permeability of the artery. This is to be recommended especially for the lower limb and is frequently possible. When it is impracticable, the author thinks that the method devised by Murphy, i.e., resecting the artery and reuniting the two sections by cir-

cular suture, is applicable. Some cases have recently been reported in the war, but full details are lacking, and it is very desirable that full reports be published of any such operations carried out. Similarly for double resection and circular suture of artery and vein, which has also been done in some cases. The author thinks that while theoretically this bivascular circular suture is a method of choice when suture cannot be done, yet in practice its realization remains problematical.

The author finally comes to the conclusion that all surgeons who have endeavored to limit their interventions to conservative or reparatory procedures in arteriovenous aneurisms of war have been led by the facts to the admission that the most radical surgery is the surest. W. A. BRENNAN.

Favre, R.: Obliteration of the Superior Vena Cava; Four Personal Cases (L'obliteration de la veine cave superiore; quatre cas personnels). *Rev. méd. de la Suisse Rom.*, 1918, xxxviii, 97.

Favre reviews the literature covering cases of obliteration of the superior vena cava either by compression or destruction of the vein or by phlebitis, spontaneous or otherwise. Favre confines himself to cases of obliteration by spontaneous phlebitis; to 5 cases found in literature he adds 4 personal cases.

In his 4 cases of specific thrombophlebitis, each of which was established at autopsy, Favre finds a syphilitic etiology. As regards pathogenesis, the inflammation may originate either primarily in the walls of the vein or in the neighboring bones. Syphilitic phlebitis originates in specific alterations in each layer of the venous wall, followed by a more or less extensive thrombosis of the vessel.

The clinical symptoms are those due to venous occlusion, i.e., venous stasis in the upper half of the body. Prognosis will depend on the prompt establishment of sufficient collateral circulation.

Physical and radiologic exploration, as well as the history, will establish a diagnosis and the treatment should be energetic and specific. W. A. BRENNAN.

POISONS

Decreton: Ignored Syphilis and Surgery (Syphilis ignorée et chirurgie). *Rev. gén. de clin. et de thérap.*, Par., 1917, xxxi, 710.

The author reports the three following cases: (1) excision of the breast for tumor; (2) resection of the knee for a white tumor; (3) resection of the toes for osteitis. In these cases there had been no clinical or other evidence which suggested syphilis. Operation, however, did not prevent the further development of the primary disease, and in course of time each of the patients came back for further treatment. Further examination and the results of Wassermann tests showed that syphilis was the cause in each case. Vigorous antisyphilitic treatment arrested further development.

The author draws attention to the necessity of instituting biologic tests in all doubtful cases, as vigorous treatment for syphilis may obviate surgical operations which may also be ineffective.

W. A. BRENNAN.

ROENTGENOLOGY

Cameron, D. F.: Aqueous Solutions of Potassium and Sodium Iodides as Opaque Mediums in Roentgenography; Preliminary Report. *J. Am. M. Ass.*, 1918, lxx, 754.

A 50 per cent solution of potassium or sodium iodide of the depth ordinarily used in roentgenographic work is almost completely opaque to the roentgen ray. If such a solution is for convenience called "full strength," the half and quarter strengths cast very definite shadows.

These solutions are made with little trouble or expense. They are stable, saline to the taste, but not irritating except on areas freshly denuded of epithelium. They are miscible with urine and blood without causing precipitation or coagulation. The simple aqueous solution is neutral in reaction and is easily sterilized by boiling.

Good roentgenograms of the human bladder filled with a 15 per cent potassium iodide solution and of chronic sinuses filled with a 50 per cent solution have been made. No bad effects have been noted. A 25 to 30 per cent solution should be sufficient for good pyelograms. Caution, however, should be observed in the use of these solutions in human subjects until further study of their effects has been made. EDWARD L. CORNELL.

Levin, I., and Levine, M.: The Biological and Clinical Evidence of the Therapeutic Value of Radium and Roentgen Rays in Cancer. *Ann. Surg.*, Phila., 1918, lxvii, 442.

In a recent publication referred to by the authors, a series of cases of carcinoma was given in which clinical arrest of the disease was obtained, accompanied by a complete absence of morphological changes in the tumor tissue due to the use of radium and the X-ray. The conclusion was drawn that the first effect of the rays consisted in the inhibition of the proliferating power of the cancer cells. Subsequently, the destruction of the cancer cells took place and sclerotic tissue was formed.

The life of an individual cancer cell is short and changes rapidly from an embryonic into an adult and then into an aged degenerated cell. Before reaching maturity each cell divides into two daughter cells and when the rays arrest the proliferation, each cancer cell matures, degenerates and dies. Rays may deeply affect one class of cells and produce no influence whatever on the other cells of the organism.

To obtain data related to the condition in human cancer, the authors studied the tumor formation in plants, known as crown gall. This is a condition

found in a great variety of plants and is due to a parasite, which may be produced artificially by inoculation. In the opinion of Smith who has studied it continually for the last ten years, it is identical with animal and human cancer.

To carry on the experiment showing the influence of the roentgen rays on the development and growth of crown gall, 43 plants were inoculated and roentgen ray treatment followed. Control plants were similarly inoculated. Four weeks later, tissues were taken for microscopical examination. At that time, all of the control plants had developed a large crown gall, while a majority of the radiated plants either showed no trace of the inoculation or merely a minute swelling at the point of inoculation. Radiated and non-radiated carcinoma tissue may have the same microscopic appearance, and still the former tissue is sterilized and may have lost to a great extent its power of proliferation and consequently its clinical malignancy.

The practical conclusion to be derived from these clinical and experimental investigations is the following: It is advisable to radiate malignant tumors not only after an operation, but in a certain class of cases also before operation so as to sterilize and inhibit the proliferation of those cancer cells which may be left behind or transplanted elsewhere in the course of an operation. Such a procedure does not prolong appreciably the time preparatory to an operation and presents no danger to the patient.

The fear expressed by some clinicians that the raying may occasionally irritate and increase the rate of growth of the tumor is unfounded. There is no clear experimental evidence of such irritating action of the rays on young proliferating cells. The result is always an inhibition. The clinical evidence of the existence of an irritating action of the rays is also very vague and not convincing. One must keep clearly in mind the fact that any malignant tumor may suddenly increase its rate of growth and consequently its malignancy without any relation to the instituted mode of treatment.

C. B. HOLLINGS.

George, F. W.: The Importance of the Position of the Upper Arm in the Detection of Roentgenological Shadows in the Region of the Shoulder-Joint. *Am. J. Roentgenol.*, 1918, v, 187.

The author found that in certain cases anteroposterior or postero-anterior plates of the shoulder-joint failed to reveal existing concretions in the subacromial region but that these could be shown clearly if the exposure were made as follows: "with the patient in the recumbent posture, the affected shoulder flush on the plate, the upper arm abducted to a right angle, rotated outward, the forearm flexed at the elbow to about 45 degrees, and the opposite shoulder slightly elevated by a sandbag."

In addition to the above three positions a roentgenogram made with the patient in the prone position and upper arm abducted is considered absolutely essential if subdeltoid shadows are to be excluded. Attention is called to the doubtful origin of these shadows and the possibility of their disappearance by treatment other than surgical removal.

ADOLPH HARTUNG.

Lawrence, W. S.: A Method of Obtaining an Accurate Lateral Roentgenogram of the Shoulder-Joint. *Am. J. Roentgenol.*, 1918, v, 193.

The method consists essentially of directing the central ray from the axilla of the opposite side through the mediastinal structures upon a plate resting against the shoulder wanted. Its object is not to supplant but rather to supplement stereoscopic exposures. It gives a true lateral view of the joint, is applicable in practically every case, and subjects the patient to no pain or inconvenience.

ADOLPH HARTUNG.

Walton, H. J.: Roentgenological Examination of the Mediastinum. *Am. J. Roentgenol.*, 1918, v, 181.

This paper may best be summarized by the author's conclusions, which are as follows:

Aneurismal shadows vary according to their location, and always show intrinsic pulsations. They are never nodular in form.

Sarcomata usually show clear-cut shadows, which are irregular or nodular in character. They are rarely symmetrical and often assume large proportions.

Spindle-cell sarcomata are invasive growths with indefinite outlines, extending, as a rule, equally in all directions.

Carcinomata do not have a typical roentgenological appearance. They usually metastasize by means of the lymphatics. The lungs are often involved and show signs of malignant infiltration.

Hodgkin's disease usually shows irregular and nodular shadows due to the hyperplasia of the mediastinal glands, and is generally accompanied by lung infiltration similar to that of tuberculosis. It is not uncommon to find the axillary and supraclavicular glands also enlarged. In children enlarged mediastinal glands are nearly always tuberculous, and frequently show deposits of calcium.

Dermoids and teratomata generally occur high in the mediastinal region, on either side of the median line, and show clear-cut symmetrical outlines. They may easily be mistaken for aneurisms.

Abscesses as a rule are centrally located, and if of long duration often contain calcium deposits within their walls. Their shadows are generally uniform in outline.

A characteristic sign, and often a determining factor in diagnosing mediastinal tumors, is the displacement of the trachea either to the right or left of the median line.

ADOLPH HARTUNG.

MILITARY SURGERY

NOTE.—Readers are referred to the Table of Contents for other articles dealing with military surgery which appear under the various headings according to our anatomical arrangement.

Vivie: Functioning of Advanced Army Surgical Posts (Réflexions sur le poste chirurgicale avancé). *Presse méd.*, Par., 1918, xxvi, Supp., 228.

The author gives some interesting details of the functioning of his advanced surgical posts between July and December, 1917. This post was situated five kilometers from the trenches and connected with the very advanced casualty clearing stations by automobiles permitting rapid evacuation. All "non-transportable" wounded in one army corps were sent to this station. Of a total of 3,457 wounded in this period, 305 were classed as unfit for transport.

These were distributed as follows: abdominal penetrating wounds, 64; thoracic penetrating wounds, 48; thoraco-abdominal wounds, 14; multiple torn wounds, 150; severe penetrating cranial wounds, 29.

Of the 305 received, 176 have been operated upon, 95 were deemed inoperable, and 34 were treated expectantly.

The large amount of inoperable cases shows that about one-third of those received are beyond surgical help in spite of all care given them. These show mostly multiple wounds of the abdomen and thorax, and die in a state of shock.

The two main clinical aspects which cause the surgeon to defer operation are: (1) extreme anæmia following hæmorrhage; (2) profound physical and nervous depression. The author thinks that these conditions can still be improved. Hæmorrhage can and ought to be better combated by an early and well applied hæmostatic band at the front. In limb wounds especially, the early, judicious, and systematic application of an elastic band greatly betters the prognosis, and since the distance between the first aid station and advanced surgical post is small, the inconveniences attributed to the method are negligible.

The profound depression which constitutes shock properly so-called is according to the author a factor of the time elapsed since injury. The shock is directly proportional to its duration. Hence extra rapid evacuation is necessary to save a large number of such cases. It is necessary to multiply the advanced surgical posts, and to increase the medical service at the trenches to the greatest possible degree of celerity and efficiency. A couple of hours gained here may save a man's life.

The results obtained in the advanced surgical posts were as follows: Of the 305 received, 120 had been evacuated in good shape; 185 died. These 305 patients were condemned if their evacuation and treatments had been deferred even a few hours. The results must be judged from the fact that the advanced and early surgical treatment saved 120 of them. The principal operations done in the advanced surgical posts were laparotomies, amputations, ligatures, disarticulations, esquillectomies and thoracotomies.

This surgery of the extreme front is very peculiar in character. It is under continual bombardments, attacks, and counter-attacks. It is peculiar on account of the multiplicity and the severity of the injuries and the necessity of evacuating the operated patients as soon as possible. The work is quickly done and the men passed on within a few hours. The work is done in a dug-out under fire of the enemy and many of the patients die on the spot. Under such circumstances the author has made 32 blood transfusions by the Jeanbrau citrated method with admirable and rapid results. Like everything else, it must be done at once.

An advanced surgical post to fulfil all its indications must meet the following requirements:

1. It must be close enough to the trenches so that the wounded can reach it within two or three hours after injury.

2. It must be sufficiently protected against bombardment so that the surgeon can operate in tranquillity and the wounded feel safe.

3. It must contain the following as a minimum: heating and reception chambers; radiologic, sterilizing and operating rooms; rooms for dressings and septic operations; and hospitalization for the patients.

4. The surgical equipment and personnel should be in every sense complete.

5. It must be able to receive some slightly wounded men who can be used as donors for transfusions.

6. It must be assured of means of rapid, comfortable evacuation to the rear hospitals.

7. Its action must be supplemented by (a) the early use of the hæmostatic band at the front; and (b) by the greatest degree of celerity in the evacuation of patients from the first aid and casualty clearing stations.

W. A. BRENNAN.

Connellan, P. S.: War Surgery in an Indian General Hospital in Mesopotamia. *Bristol M.-Chir. J.*, 1917, xxxv, 113.

The author was stationed in a base hospital in Mesopotamia halfway down the line of communications. The transportation of the sick and wounded was mainly by river boat, the journey usually being a very protracted one. Emphasis is placed on the advisability of putting the men to bed immediately, giving them a complete change into hospital clothes and as much of a bath as possible. The sick were given some warm food, especially milk if available.

After the men were comfortably settled, and not until then, were the dressings changed. At this time all dressings were removed and clean ones applied. Morphine and soporifics were given unsparingly the first night. Medical and surgical treatment was as simple as possible. Surgical proceeding whether in dressing or operating was conservative. Open air dressings although approved of were not done because of the dust and sand. Bichloride of mercury was used in wound treatment and was found to be most efficient; it was easily obtained, readily made, and not affected by the climate. All foreign bodies were removed; this was done not only to prevent subsequent infection or to relieve a present one, but to satisfy the Indian sepoy, who, it seems, has an almost superstitious dread of a foreign body. R. B. BETTMAN.

Derkel, D.: The French Sanitary Service. *Mississippi Valley M. J.*, 1918, xxv, 65.

Multiple wounds of the same individual are the rule in this war and they are always serious because of the intense shock caused by the wounds. Derkel received 97 shrapnel wounds from the bursting of one shell. Bullet wounds are not taken much account of in the field hospitals. These multiple wounds and the shock are more severe because of the delay in treatment. Complications set in such as gangrene and septic infection. The first aid which everyone carries in his pocket is far from sufficient for such wounds.

During the first retreat it was necessary to evacuate the advanced zone as rapidly as possible, and the first aid consisted in preliminary disinfection with tincture of iodine and the application of bandages. Ordinarily the wounded were taken by stretcher bearers from the first aid dressing stations to the field hospital where a system of disinfection would be made and operation performed when necessary. During the retreat, the field hospitals, being a link in the advancing chain of the Sanitary Service, had to move and it was necessary to move the patients immediately to the hospitals in the rear. The wounded were so many that in a few hours 400 or 500 in terrible condition would reach these hospitals and overwhelm the staffs. Since the battle of the Marne the aspect has been changed, since it is a stationary war, and the Sanitary Service, in spite of having lost in personnel and material, renders more efficient service.

Now they start at the regimental dressing station and the wounded are then transported to the stationary field hospitals and classified. These hospitals are served by sanitary automobiles of the army corps. Such stations should have very good oculists with material for glasses.

For more direct communication bicycle men should be attached, one to the battalion surgeon, one to the regimental surgeon, and one to the chief surgeon of the field hospital. For the chief surgeon of the division and the chief sanitary surgeon, motorcycles for rapid transportation of messages have been provided. These two surgeons are also supplied with automobiles.

The medical personnel is now 9 instead of 7 in a regiment. There is a total of 48 wheeled stretchers and 48 supplemental stretchers for a regiment of the army corps of two divisions. There are also four-wheeled carriages for each regiment. The sanitary automobile sections of the army corps are used for transporting wounded in some instances, from the very limit permitted by technical conditions, to the field hospitals, to the observation hospitals, to the stationary hospitals, and to the central hospitals. They take the wounded from the dressing stations to the rear with a surprisingly small amount of delay.

The transportation service has been divided into three parts. Each part has 10 ambulances that can carry 30 wounded lying down or 40 sitting up. In addition there are the stretcher wheel bearers to transport dressing materials, and two touring cars, one for the commanding officer and one for the adjutant. An automobile is put at the disposal of the chief medical officer of the Medical Reserve Section. In spite of the very efficient field hospitals, surgical automobile ambulances are utilized which are equipped especially for emergency surgery for the seriously wounded, including sterilizers for dressings and instruments. With each surgical automobile ambulance there are 2 surgeons and 2 chief anæsthetists, each one being on duty for eight consecutive hours. There are also groups of motor trucks used to carry materials and each carries an operating room with materials for surgical shipment. Ninety of these groups are in service on the French front and 50 more have been prepared for special work in the Sanitary Service.

First aid dressing stations are established close to the point of battle and these are especially necessary since asphyxiating gases are being used. Large, warm rooms free from dust are established, where inhalations of oxygen, simple fumigation with menthol, or subcutaneous injections of caffeine are given. These cases should not come in contact with other diseases.

Subterranean stations are established with apartments 18 or 20 feet long for the classification of cases, an examining room where antitetanic serum is given, and a dressing and operating room; a dormitory for the personnel of the station, an eating room for the wounded after operation, a sterilizing room, wash room, kitchen, latrines, etc. Every surgical unit of this kind costs about $20,000.

Base hospitals and hospitals in the interior are not described in detail. CARL R. STEINKE.

GYNECOLOGY

UTERUS

Stone, W. S.: An Estimate of Radium Therapy in Uterine Cancer. *Am. J. Obst.*, N. Y., 1918, lxxvii, 390.

Stone's report is based upon a study of 400 cases of cancer in which radium has been employed, 80 cases of uterine involvement being under observation at the time this paper was prepared. For purposes of classification the author divides his cases into four groups, the extremely advanced, the advanced, borderland lesions, and early lesions. In addition are the cases after operation and those in which radium may be used after operation as a prophylactic agent. He summaries his observations as follows:

1. It is an agent peculiarly suitable for the treatment of uterine cancer, and is more effective for the arrest of the progress of the disease, as it is ordinarily presented to the clinician, than any other method that has hitherto been employed.
2. It is more effective in primary lesions than in recurrences.
3. It will occasionally relieve pain in the terminal stages of the disease.
4. It will relieve pain, stop hæmorrhage and discharge, and restore the general health in a large number of advanced lesions more effectively than any other agent.
5. It will convert borderland lesions into such as are plainly operable, and without surgery it will effect a disappearance of the gross evidences of the disease, and will restore health in a large number of such lesions much more effectively than surgery alone has hitherto been able to do.

CAREY CULBERTSON.

Mills, H. W.: Sarcomatous Degeneration of Uterine Fibroids; Report of Two Cases. *Interst. M. J.*, 1918, xxv, 230.

The author reports two cases of sarcomatous degeneration of uterine fibroids and gives a résumé of the recent literature on the subject.

He refers to the relative frequency of this sequela and insists on the careful routine microscopic examination immediately subsequent to the removal of all uterine fibroids; only in this way will a correct estimate be arrived at of the frequency of this complication, a complication which must materially affect the ultimate prognosis in these cases.

He insists on the fallacy of an opinion based on a cursory postoperative macroscopic examination of such tumors and quotes Winter who found a percentage of only 3.2 in a series of 500 cases in which microscopic examination was made in "suspicious cases" only, but in a further series of 253 cases in which a routine systematic microscopic examination was made, found that the proportion rose to 4.3 per cent.

Cernezzi, A.: Surgical Intervention in Uterine Fibromyomata (Sull' opportunita dell' intervento chirurgico nei fibromiomi uterini). *Ann. di oslet. e ginec.*, Milano, 1917, xli, 143.

The author has operated in 50 cases of uterine fibromyoma. Of these interventions, 47 were subtotal hysterectomies and 3 were total, with the accompanying removal of both adnexæ in 20 cases and the removal of one only in 18 cases. There has been no fatality.

While the generally accepted methods of executing subtotal hysterectomy have been followed, there are numerous points of technique which contribute to the good or bad results of an operation. The author adopted spinal anæsthesia in 31 cases. In 19 cases prior to 1911 he used chloroform. For the spinal anæsthesia he injects 10 cg. of 5 per cent tepid novocaine in the fourth lumbar space. Twenty-five cg. of caffeine are injected before the novocaine. The author remarks that French rubber gloves of the Chaput model are preferred to the American gloves.

A left paramedian incision is made usually. The rectus is opened about a finger-width outside the median line, which gives better reunion than an exactly median situation. In some cases the Pfannenstiel and Bardenheuer transverse incision has been employed. Section of the broad ligaments is usually begun from the right side.

In his earlier cases the author used cigarette rubber abdominal drains, but since 1912 he has discontinued drainage, which he considers not only useless but dangerous except in rarely indicated cases.

No serious incident disturbed the postoperative course of any of the author's 50 cases. All the patients were able to be up by the tenth to the fourteenth day. There were 2 cases of postoperative hernia, in one of which a cigarette drain had been used. Forty of the patients have been reviewed at a considerable time after operation and the excellent condition warrants the author in his views regarding the advantages of abdominal subtotal hysterectomy for fibromyoma.

When it is remembered that thirty years ago abdominal hysterectomy for fibroma gave a 25 to 30 per cent mortality, it appears marvelous that technical progress has evolved an almost innocuous operation. The present operative mortality is less than 1 per cent and in some cases even zero.

W. A. BRENNAN.

Frank, J.: Obstructive Dysmenorrhœa and Sterility; a New Operation. *J. Am. M. Ass.*, 1918, lxx, 985.

The operation recognizes the value of the posterior incision in straightening out the cervical canal and so correcting the stenosis at the internal os. The cervix is grasped at the uterovaginal junction with small uterine tenaculum forceps, one on each side, and pulled outward and upward. An incision is made in the middle of the posterior lip extending well up to and past the flexion. The tenacula are then removed and used to spread apart the two halves of the posterior lip. With a very small-bladed, spear-shaped knife made on the catlin order, wedges of tissue are removed from the two raw surfaces of the posterior lip, leaving a trough. Just enough tissue is removed to allow easy and exact approximation of the entire cervical and vaginal surfaces. The first suture is commenced at the angle of the posterior incision and extreme care taken to approximate accurately the internal cervical and the vaginal mucosa at this point. This is important to avoid healing by granulation and so secondary contraction. Twenty or forty day No. 1 chromic gut is used in a continuous or interrupted suture.

The original Pozzi operation is ideal in cases of true "pin-hole" os, that is, for obstruction at the external os. But in many cases the dysmenorrhœa and sterility result from angulation of the utero-cervical canal at or near the internal os. The author's experience leads him to believe that angulation never takes place above the internal os. This angulation is completely done away with by the operation described, by eliminating entirely the canal below the angulation, as the posterior incision extends up to and beyond this point.

EDWARD L. CORNELL.

Pemberton, F. A.: Hæmorrhage from the Uterus in the Non-Pregnant Woman. *Boston M. & S. J.*, 1918, clxxviii, 485.

Pemberton divides the causes of uterine pathologic bleeding into pelvic and extrapelvic; the latter is seen occasionally in acute infectious diseases, especially influenza, nephritis, chronic passive congestion from cardiac disease, and arteriosclerosis. Rarely is the hæmorrhage bad enough to endanger the patient's life. Pelvic causes should always be searched for first. Almost every gynecological condition is accompanied by either menorrhagia or metrorrhagia or both at some stage of the trouble. A bloody vaginal discharge before puberty may show the rare condition of sarcoma of the cervix. Profuse menorrhagia in the first decade after puberty may show no definite pathology, though several theories for the cause have been advanced but not proven. Occasionally cervical polyps and erosion of the cervix are responsible for the bloody discharge.

During the period of sexual maturity there are many and varied causes for bleeding. Following completed or interrupted pregnancy there may be retained placenta, chorio-epithelioma, or puerperal sepsis. Regarding inflammatory diseases, in acute salpingitis there is usually menorrhagia and metrorrhagia, though not serious. In the chronic stage the menorrhagia is due to chronic passive congestion. In tuberculosis of the tubes when the process extends to the endometrium, in about two-thirds of the cases there is a watery, bloody discharge, following the primary amenorrhœa, which is of great significance. Mucous polyps are a frequent cause of bleeding, especially when they become necrotic. They increase in frequency toward fifty years of age. The cervical polyps are often multiple in number and rarely cause serious bleeding.

Fibroids frequently cause menorrhagia, but only when they are submucous, necrotic, undergoing malignant degeneration, or when they cause a retroversion with the resulting passive congestion. Some cases of retroversion and prolapse have menorrhagia. Non-malignant tumors of the ovaries show some bleeding only in cases of twisted pedicles. Malignant tumors of the ovaries frequently cause irregular flowing and menorrhagia.

Toward the climacteric period there are two forms of menorrhagia; one with a large uterus, and no other evident pathology; the other shows a polypoid gland hypertrophy of the endometrium. Lacerated cervix and erosions also cause bloody discharge. At this time cancer should always be thought of, though no age is cancer-proof. After the menopause, all bleeding should be considered with the greatest suspicion. It ought to be taken for granted that bleeding in a woman over seventy years indicates cancer of the fundus of the uterus. According to the author's figures, 45 per cent of women bleeding after the menopause have cancer.

Senile vaginitis is characterized by a bloody discharge of a watery consistency which often irritates the vulva, causing pruritus.

As to diagnosis and treatment of the various conditions; chorio-epithelioma is rare and early diagnosis rather difficult. A sudden hæmorrhage, following either shortly or even months after the passing of a hydatid mole, miscarriage, or labor should be investigated by examining the uterus carefully with a curette, the patient being etherized. The growing of a bluish tumor from the cervix is diagnostic evidence. The curetted tissue will show syncytium and Langhan's cells. Chorio-epithelioma grows rapidly and early diagnosis and treatment are very important.

Bleeding in puerperal sepsis due to retained placenta will be relieved when the latter is removed and the endometritis cleared up.

Fibroids are usually easily diagnosed. The small submucous variety require ether examination and the aid of a curette to map out the uterine cavity. Those showing rapid growth are best taken out. One or two per cent of all cases show the fibroid undergoing sarcomatous degeneration. Small uterine polypi of the endometrium cannot always be diagnosed even by the curette. If it seems best

not to use the X-ray, and at the same time desirable to save the uterus, the latter should be opened, and if possible, the polypi removed before hysterectomy is attempted. Polypoid gland hypertrophy can be diagnosed only by the curette. Early cancer can only be diagnosed by means of the microscope. Adenocarcinoma of the fundus nearly always occurs after the menopause. Bleeding in cancer is rather a late symptom, and the diagnosis should be made early. Carcinoma may be associated with other non-malignant conditions, and finding the latter should not prevent the search for the former. Menorrhagia in young girls should be treated by rest in bed during menstruation and proper attention to hygiene, exercise, mode of life, etc. If no improvement is apparent in two or three months, pelvic examination under ether is advisable. Tightly packing the vagina with gauze, the inner end saturated with iodine or alcohol, will control the bleeding. Drugs are of little benefit. Pituitrin is worth trying. Dilatation and curettage is of value in some cases.

The uterine insufficiency in the young and the old is satisfactorily treated by X-ray and radium. X-ray requires large doses for from nine to eighteen weeks to produce amenorrhœa, while one treatment of radium will do the same. Radium is especially valuable in controlling the bleeding from inoperable cancer of the cervix. Occasionally it seems to stimulate the growth of the tumor, hastening fatal termination. Care must also be taken not to cause vesicovaginal and rectovaginal fistulæ, which may follow the application of strong doses.

L. R. GOLDSMITH.

Robins, C. R.: The Pathological Uterus at the Menopause. *Am. J. M. Sc.*, 1918, clv, 313.

The operation of hysterectomy was done upon 58 women who were forty years old and over. In 28 the operation was performed for fibroids, pelvic inflammation, and other conditions in which the impossibility of conserving the organs was manifest and beyond dispute. In the remaining cases, cancer was either a positive or a possible diagnosis. In 4 a positive diagnosis of cancer of the cervix, afterward confirmed by the microscope, was made and a Wertheim operation, preceded by cauterization with the Percy cautery, was done. In 26 a diagnosis of chronic metritis, including in this induration of the cervix, was made and a possibility of malignancy considered. In practically all of these patients bleeding from the uterus was a prominent symptom, manifesting itself as irregular or continuous bleeding, and sometimes accompanied by marked anæmia. In 2 cases cancer of the fundus was found on opening up the uterus.

The author has come to the following conclusions and has made them the basis of his practice for some years:

1. In cases considered favorable for cure after operation, it is not always possible to make an exact diagnosis.

2. In an effort to make an exact diagnosis, one is liable to lose the advantage of an early operation by an effort to secure tissue for examination, in this way disseminating cells and stimulating vicious growth.

3. A pathological uterus is potentially a malignant one, and even if cancer is not already present, it may develop later.

The line of safety, therefore, requires that in those cases occurring in women about the menopause or after, where the symptoms and physical findings would suggest the possibility of malignancy, the procedure should be a total extirpation of the pelvic organs and the pathological investigation made after the organs have been removed. In 26 such cases cancer was found in 2, or in slightly less than 8 per cent.

These conclusions are based upon the consideration of malignancy alone, but there are other very excellent reasons for removing such uteri. In the first place they are pathological and have produced enough symptomatology to cause the patient to consult the physician. The pathology has usually existed for a long period of time and the alterations have become so permanent that conservative measures are liable to be disappointing in results.

EDWARD L. CORNELL.

ADNEXAL AND PERIUTERINE CONDITIONS

Pages, F.: Giant Para-Ovarian Cyst. (Quiste para-ovarico gigante). *Rev. de med. y ciruj. de la Habana*, 1918, xxiii, 105.

The case reported by Pages is interesting on account of the enormous size of the cyst. The patient was a white woman aged twenty-eight years. The abdomen was first noticed to increase in size at the twentieth year and continually increased till she came to the clinic, when the umbilical circumference measured 1.8 meters. A diagnosis of para-ovarian cyst was made and the woman was operated upon.

A median infra-umbilical laparotomy was done; the tumor was adherent to the parietal peritoneum. It was stripped from its surroundings and punctured with a trocar which withdrew 46 liters of colorless and transparent fluid. The cyst was not pediculated and was inserted in the broad ligament. It was totally enucleated. The uterus and right adnexæ were normal. The left adnexæ were greatly enlarged.

The cyst was an unilocular hyaline cyst and on account of its proximity to the ovary ought to be included in the category of para-ovarian cysts.

Before operation the distance from the pubis to the xiphoid measured 90 cm., and on incising down on the cyst an incision approximately one meter in length was necessary.

The woman made an uneventful recovery and was up in less than a month. The author has not been able to find in literature a para-ovarian cyst equaling this in dimensions. W. A. BRENNAN.

EXTERNAL GENITALIA

Rawls, R. M.: A Preliminary Report of an Operation for Cystocele. *Am. J. Obst.*, N. Y., 1918, lxxvii, 359.

The author bases his work on the anatomy of the pelvic structures as outlined by Piersol and Cunningham, and his operation consists in the overlapping of certain layers of fascia after careful dissection. Technically it commences with a median incision through the anterior vaginal mucosa and underlying connective tissue. These cut edges are retracted and the incision carried forward until in the midportion the bladder can be demonstrated by blunt dissection. This is continued downward until the cervical attachment of the bladder pillars and the so-called uterovesical ligament are demonstrated. The latter is cut with scissors, keeping well in midline in order to avoid severing any of the cervical attachments of the bladder pillars.

The bladder is next separated by blunt dissection as far up as its peritoneal reflexion from the cervix and well out to either side, care being taken to free it from the underlying pillars upward to the urethra. If there is an urethrocele the dissection is carried up to the external urethral orifice. When the bladder is well mobilized its pillars are dissected from the underlying vaginal mucosa.

The next step must be done carefully in order to avoid destroying or buttonholing the fascial sling. With a finger under the mucosa as a guide, the thinned-out fascial edge is dissected with a knife from the underlying mucosa. The mucosa flap is made paper-thin and forceps are applied as tractors to the fascial and mucosal edges. This cutting dissection is continued from the midline, downward and upward for a short distance laterally until a distinct line of cleavage can be demonstrated the whole length of the primary incision, after which further separation by blunt dissection is secured from the overlying pillars well out on either side to the "arcus tendineus."

The bladder and its true lateral ligaments are now freely mobilized and the latter are overlapped from side to side by transverse mattress sutures of kangaroo tendon, one or two sutures entering the cervical tissue at the level of the internal os. These sutures prevent anteroposterior shortening of the anterior vaginal wall and draw the underlying fascia smoothly under the overlapping fascia. The cervical suture re-attaches the fascia to its original place on the cervix and forms a shelf on which the bladder rests. The free edge of the overlapping fascia is then closed over the underlapped fascia by interrupted kangaroo-tendon sutures. The thin vaginal mucosa flap is now excised for a short distance on either side and its edges approximated in midline by interrupted chromic catgut.

Rawls claims that:

1. This technique offers a strong and anatomical restoration of the supports of the bladder without causing anteroposterior shortening of the anterior vaginal wall.

2. It gives promise of restoring the anatomical relations of the bladder and of preventing the many abnormal conditions found by cystoscopic examination in the bladder after a cystocele operation.

3. The method is applicable to all forms of cystocele, but in the presence of complete prolapse of the uterus, other methods must be used in addition, to relieve the injury to the posterior segment of the "holding apparatus" and the injury to the "supporting apparatus." CAREY CULBERTSON.

MISCELLANEOUS

Caouette, J.: Notes of Gynecologic Practice (Notes de pratique gynécologique). *Bull. méd. de Québec*, 1918, xix, 233.

The author relates a curious and rare case of ectopic pregnancy, the ovum being developed in the neck of the uterus. The patient was a nullipara of twenty-three years, with a history of a two months' pregnancy. She was brought to the hospital on account of sudden profuse and continuous hæmorrhage accompanied by pain in the lower abdomen. The case was believed to be one of abortion.

On examination the vagina was found filled by a violet-colored tumor. A curette brought away clots and a disrupted ovum which was very adherent to the internal face of the tumor. After examination the author found that the tumor was the distended uterine neck. Its internal orifice was closed. The body of the uterus was normal. The author states that the fecundated ovum was grafted and developed in the neck; and abortion was produced when the limits of distention were reached. There is no question as to its being a secondary development of an ovum primarily developed in the uterine cavity.

W. A. BRENNAN.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Losee, J. R.: The Cæsarean Scar; an Anatomical Study. *Bull. Lying-In Hosp.*, N. Y., 1918, xi, 228.

The following observations were made from twenty different specimens of uterine scar removed from the uterus at or near term. All the previous cæsareans were the transperitoneal operation of the high incision type. In nine there was a complete or partial rupture of the uterus and in eleven an incision was made either through the old scar or adjacent to it, and the whole scar or the edges were afterward excised for examination. Many specimens were taken while the uterus was partially contracted, and others after rupture with complete contraction.

In a clean wound after incision, leucocytes, red blood-cells, fibrin and later young connective-tissue cells separate the surfaces. These are afterward absorbed and eventually the muscle and fibrous tissue strands separating the muscle bundles assume the relationship normally observed in other areas of a postpartum uterus. Other than thickened peritoneum, there is no scar tissue observed macroscopically or microscopically in the myometrium, in the line of the former incision when examined at subsequent cæsarean operations.

When infection takes place and the cut surfaces are infiltrated with leucocytes and serum, associated with more or less necrosis, then only that muscle tissue remains which has not become necrotic. Such a scar at operation is from ½ to 2 cm. broad, white, and depressed. The tissue comprising it may be only serosa and decidua or these may be separated by varying thicknesses of muscle, depending on the extent of destruction or the degree of union which has taken place after the operation. This pathological process may take place in one small area of the wound or may extend throughout. Even in these cases no excess of fibrous tissue is observed in the line of incision; however, in two of the scars examined a small amount of muscle adjacent to the decidua was replaced by fibrous tissue.

Nearly all of the sections examined showed a thickened vascular serosa which occasionally invaded the adjacent myometrium for a short distance. This invasion may have been due to some inversion of the serosa in suturing and in others to a proliferation of the fibrous tissue of the peritoneum. In only one of the twenty cases did the fibrous tissue extend into the muscle to a marked degree, and even then it was not sufficient to weaken the scar.

Again, if the cut surfaces are separated aseptically, due to some mechanical influence, the same picture is presented. In the non-pregnant uterus these surfaces approximate one another, but they are not firmly united, and when the uterus enlarges during pregnancy they separate, leaving only the muscle tissue that did unite at the upper angle of the wound. This gives the wound a triangular appearance on cross-section, and very often the sides of the triangle are covered with decidua, and if the placenta is situated beneath the wound, villi are also observed.

Of the nine cases of rupture at operation two presented an utero-abdominal fistula, in seven the whole scar was laid open, and in three of these the placenta and fœtus were in the peritoneal cavity. A review of the clinical data of these cases shows that only four had fever complicating the operation immediately prior to the rupture, and the time between the last section and the examination varied from one to five years. In four of the seven cases of complete rupture miscroscopical examination showed that villi were present either in the angle of the old wound or along its edges. Decidua was also observed lining the edges of some of the old scars. In two cases a slight excess of fibrous tissue was observed and this was found on the inner surface between the decidua and the normal muscle. It was in no way connected with the former line of incision.

There was no fat present in the muscle-cells of any of the sections. Inasmuch as fever was present as a complication in only four of the cases, one would conclude that foreign material, either blood or lochia, prevented a firm union of the scar in the other five. The very fact that decidua covered the edges is sufficient to prove that these margins were separated when the patient became pregnant.

Five moderately strong scars were found on examination of the whole scar or margin only. In two of these there was no fever after the previous section; in two the previous history was not obtained, and in one the patient had some temperature. Miscroscopical examination of one of these scars showed a small area in which the muscle was replaced by a delicate fibrous tissue network, and in another there was more extensive proliferation of fibrous tissue beneath the peritoneum than is usually observed. In four the placenta was attached directly beneath the wound, which shows that the location of the placenta had little effect on the scar, providing there was firm union after the previous operation. There were six cases in this series which presented thin scars varying from the peritoneum only between the edges of the myometrium to different amounts of muscle tissue. Three of these had fever following the preceding operation; an excess of fibrous tissue was not observed in any of them.

The author draws the following conclusions:

1. The strength of the uterine scar after cæsarean section depends upon the absence of infection and foreign material and upon the perfect coaptation of the incised surfaces.

2. A perfectly healed wound leaves the myometrium as strong after operation as before, as far as can be determined by the histological examination of the tissue in the line of the former incision.

3. A continuous suture in the myometrium adjacent to the decidua may assist in preventing the separation of the cut surfaces by blood-clot or lochia in addition to the usual interrupted suture through serosa and myometrium.

4. The placenta in a subsequent pregnancy has little or no effect in weakening the firmly united scar, but if the scar is already weak it may accentuate this weakness.

5. Other than a small amount of fibrous tissue beneath the peritoneum, the myometrium in line with the former incision contains no scar tissue and the uterine muscle regenerates.

6. Rupture invariably takes place through the site of the former scar and not through the adjacent muscle tissue.

7. Without definite means of estimating the strength of the uterine scar after cæsarean section, subsequent pregnancies must always be carefully observed as they approach term.

EDWARD L. CORNELL.

Ries, E.: The Treatment of Septic Abortion. *Surg., Gynec. & Obst.*, 1918, xxvi, 400.

Cases of abortion without fever may safely be left to spontaneous termination, the only contraindication being severe or protracted slight hæmorrhage.

Cases of septic abortion are no exception to this rule. They can terminate spontaneously according to Type 1, in which the abortion takes place spontaneously during the fever and the fever drops after the abortion; or according to Type 2, in which the fever drops under expectant treatment and the abortion takes place subsequent to the fall of the temperature.

In cases of septic abortion, the temperature may be expected to drop under expectant treatment, and if interference becomes necessary, Type 3 of the temperature curve may be observed, no rise of temperature after the operation; or Type 4, a short rise of temperature after the interference followed by rapid and final fall of temperature.

Lastly, severe hæmorrhage necessitating evacuation of the uterus in the presence of sepsis may be followed by immediate and lasting fall of temperature.

If a patient with septic abortion is admitted to the hospital, expectant treatment is followed until the abortion is completed spontaneously. Rectal examination is used exclusively and that as rarely as possible. The patient is kept in bed and on a light diet. If severe or protracted slight hæmorrhage makes interference unavoidable, the uterus is packed. The packing is removed after twelve to twenty-four hours and frequently the whole remnants of the abortion come away with the packing. If not, the packing has usually dilated the cervix sufficiently so that the uterus can be emptied manually. Repeated packing is not favored as dangerous in itself.

If the uterus is not empty after the removal of the packing, it is emptied preferably by hand, if necessary after additional dilatation with Hegar's dilators; and if the hand is insufficient, with the sharp curette. The longer the interval between the last rise of temperature and the operation, the better. Packing afterward is avoided unless necessitated by severe hæmorrhage. The uterus is never irrigated. Ergot is given only when hæmorrhage exists after complete evacuation of the uterus. Vaginal douches are never given until at least a week after the abortion and then only for subinvolution, not for purulent discharges.

If the temperature is normal after the abortion, the patient is allowed out of bed at any time she feels ready, unless she is very anæmic. The patient is fed well as soon as possible. The patient is discharged three days after the last rise of temperature, unless anæmia, subinvolution, etc., require longer hospital treatment. Rectal examination is repeated before discharge. EDWARD L. CORNELL.

Findley, P.: Pernicious Anæmia Complicating Pregnancy. *Tr. Am. Gynec. Soc.*, Phila., 1918, May.

Findley reports a case of pernicious anæmia complicating pregnancy and raises the question as to whether or not pregnancy should be interrupted in the early phase of pernicious anæmia.

A review of the literature leads very directly to the conclusion that pregnancy and the puerperium favor the development and hasten the course of pernicious anæmia. While pernicious anæmia is not a disease peculiar to pregnancy it is nevertheless true that the disease occurs with unusual frequency in the course of pregnancy and the puerperium. Just what the predisposing factors are in pregnancy is not known. Prolonged lactation, frequent childbearing, the toxæmias of pregnancy, and unfavorable hygienic surroundings are factors to be reckoned with but are not conclusive. Neither postpartum hæmorrhages nor puerperal infection tend to develop pernicious anæmia, judging from case records. It is of interest to note that with few exceptions pernicious anæmia rarely develops in primiparæ and is more frequently observed in a pregnancy which has been preceded by the birth of several children in rapid succession.

In reviewing the reports of cases, one is struck with the frequency with which it is recorded that the patient was seemingly in perfect health until early in the second semester. As a rule she had borne several children without mishap; there were no evidences of ill health until the sixth or seventh month of gestation when there was observed a rapidly increasing pallor, associated with digestive

disturbances, hæmorrhages from the nose, stomach or bowel, rapidly failing strength, dyspnœa, vertigo, headaches, disturbed vision, palpitation of the heart and eventually œdema of the lower extremities, loss of reflexes, ataxia, rapid pulse-rate and the development of a low grade of temperature.

Such are the clinical and anatomical findings in typical cases, but there is a time in the development of the disease when a positive diagnosis cannot be made. This may be called the incipient stage of pernicious anæmia, a time in the course of the disease when an existing pregnancy may hasten the development of a hopeless condition which without the influences of pregnancy might have been averted. This brings up the question as to whether pernicious anæmia is ever curable.

In every frank case of pernicious anæmia complicating pregnancy the maternal mortality is 100 per cent, although in exceptional cases death may be deferred for a period of weeks, months, or even a year or more following childbirth.

The management of these cases may be said to be in the interest of the mother in the early stages of the disease and of the child in the late stages of the disease. Where the disease is well advanced, the child living and approaching the period of viability, pregnancy should be allowed to proceed to term if possible in the hope of delivering a healthy child. The case of the mother is hopeless and no good could come from sacrificing the child by the interruption of pregnancy.

If the interruption of pregnancy is to accomplish any lasting good, the pregnancy should be terminated in the incipient stage of the disease. It is only in such cases that the author sees any justification for the sacrifice of the child.

Iyer, A. L. A.: Split Pelvis. *Madras M. J.*, 1918, i, 35.

The patient, aged twenty-eight years, was admitted to the hospital in labor. She was a para-II and had had a previous abortion. The height of the uterus showed that she was full term. She had strong uterine contractions and the child presented in occipito-dextro-anterior position, with fœtal heart beats rather slow.

The lower portion of the anterior abdominal wall was found to be a raw, irregular surface covered by mucous membrane which was evidently the posterior wall of the bladder. The orifices of the ureters could be easily distinguished as urine was constantly dribbling through them. There was no symphysis pubis and there was a gap of about two inches in the middle line between the pubic bones so that the anterior portion of the pelvis was gaping widely. There was no urethra. Just below and behind the raw surface was the orifice of the vagina, which was very narrow and admitted only a finger, through which the scalp could be seen. As there was no union at the symphysis, there was marked flaring of the anterior superior iliac spines like that met with in flat pelvis. External pelvic measurements showed that both intercristal and interspinous diameters were equal. The external conjugate could not be taken on account of the absence of the symphysis.

Episiotomy was done and the child delivered with slight fundal pressure. Probably the woman would have delivered herself but for the narrow vaginal orifice. The puerperium was uncomplicated.

EDWARD L. CORNELL.

LABOR AND ITS COMPLICATIONS

Bernstein, H. A.: The Immediate Operation for Perineal Lacerations. *J. Am. M. Ass.*, 1918, lxx, 1217.

The mucocutaneous edge of the wound at each side of the tear where it enters the vagina is caught up with a guide and traction suture. The operator or assistant, with regulated tension on these sutures, holds the wound open for inspection. The labia are widely separated, the wound is cleansed, bleeding points are controlled, and the torn edges of the muscles, which are generally represented by depressions in the side walls of the wound, are brought out with tenacula or temporary sutures and joined with chromic catgut, and the number of interrupted sutures are made according to the requirements of the case. Before the muscles are brought together, the cervix may be exposed for inspection and repair.

After the muscles have been replaced, if the wound is deep, slack may be taken up in the connective tissue by one or two buried catgut sutures. With the guide sutures held in position for repair, the edges of the vaginal mucous membrane are now joined with a continuous chromic gut suture, and the outer side of the perineum is repaired with three or four silkworm-gut sutures deeply and widely inserted.

In complete tears, the rectal mucous membrane must be approximated first. The torn ends of the sphincter muscle are then brought out of the wound and firmly secured together, and the operation is completed as above.

It is important in complete tears that a rectal tube be inserted about four inches into the rectum and retained there about four days. The bowels should not be moved during this time and all discharges escaping through the tube should carefully be kept away from the wound and the perineum should be disturbed as little as is compatible with careful cleanliness. EDWARD L. CORNELL.

Garcia Parra, I. M.: Spontaneous Rupture of the Uterus During Labor; Uterine Fibroma (Ruptura espontanea del utero durante el trabajo del parto; fibroma del utero). *Gac. méd. de Carácas*, 1918, xxv, 40.

The patient in this case, a multipara aged forty-one years, was brought to the hospital in a moribund condition. Labor had lasted thirty-six hours. A few hours before coming to the hospital she had experienced a sudden acute pain after which she fell into a state of syncope. The labor pains ceased,

some blood issued from the vagina with part of the cord. The attending midwife dragged on this, pulling away the placenta and leaving the fœtus to die if not already dead.

The author endeavored to make a manual extraction of the fœtus and found a vertex presentation. Passing along the left side in order to perform a version, he suddenly felt a large cavity, the abdominal cavity, and a foot of the fœtus was traced in the left hypochondrium. A rapid extraction was made without great difficulty. A large hard tumorous mass was then located in the right side of the abdomen. Examination of this and the antecedents of the case left no doubt that it was the retracted uterus notably increased in volume by a fibroma in the thickness of the walls of the organ.

After extraction of the fœtus some intestinal loops herniated into the vagina, but these were replaced and a gauze tampon inserted.

The indications were for a laparotomy but the desperate condition of the patient caused the author to temporize. The woman died two hours later from internal hæmorrhage.

Autopsy showed a rupture in the uterus extending from the lower segment backward through the middle segment to the insertion of the broad ligament and terminating in the neck below, thus occupying almost a complete anterior semicircumference of the organ. The superior segment was filled by a tumor about the size of a large cocoanut. It was clear that the pregnancy had developed in the lower part of the uterus and that its distended wall could not resist and ruptured under the expulsive contractions. It would seem impossible that the pregnancy should have proceeded to term under the circumstances. However, the fœtus was normal in size and development. W. A. BRENNAN.

Hoag, J. C.: Nitrous Oxide Analgesia in Obstetrics. *Illinois M. J.*, 1918, xxxiii, 224.

Gas analgesia for six or eight hours is perfectly safe for healthy patients, if properly managed. Gas does not prolong labor, but tends to shorten it and does not lead to physical depression and postpartum hæmorrhage. The prolonged use of chloroform and ether is distinctly dangerous. The author disagrees with those who say that the technique of gas analgesia is so simple that it readily may be entrusted to a nurse or a member of the patient's family. Such a procedure may not be dangerous, but is unproductive of good results. The proper technique can only be learned by very considerable experience, the best results being only obtainable by experts.

Most women who have had gas administered to them have experienced some relief, but not what was their due. Very little oxygen is required and too much of it has been used. In obstetric analgesia the rebreathing bag makes only for a small economy and is, in some respects, objectionable. There is little or no danger of asphyxia to the child, but if it is born asphyxiated, the condition can be relieved by giving oxygen through the mother to the child by the simple expedient of leaving the funis untied until oxygen has been administered freely to the parturient mother.

Internes who make only occasional use of the gas are not satisfactory anæsthetists, and they are, through their unfamiliarity with the proper use of the gas, very wasteful of it and mainly responsible in hospitals for the complaints heard regarding the cost, which is not great under proper control.

EDWARD L. CORNELL.

PUERPERIUM AND ITS COMPLICATIONS

McNeile, L. G.: The Effect of Ingestion of Desiccated Placenta During the First Eleven Days of Lactation. *Am. J. Obst.*, N. Y., 1918, lxxvii, 377.

A preliminary report of the effect of feeding desiccated placenta during the first eleven days of lactation is offered by McNeile, in which he gives a number of detailed tables and reports results. Thirty grains daily of desiccated human placenta were fed to eight of sixteen healthy patients, the diet of all being the same throughout the period of study. The milk was collected from each patient on the third, fifth, seventh, ninth and eleventh days. The babes were weighed at birth and once daily thereafter. The author's conclusions are as follows:

The results do not warrant any definite conclusions. In the cases which were fed desiccated placenta there was apparently some change in the chemical composition of the milk during the first eleven days postpartum. The most marked change was an increase in the percentage of lactose and this was accompanied by a slight increase in the percentage of protein, and a slight decrease in the percentage of fat.

There was no deficiency in the amount of milk in any of the cases receiving desiccated placenta, but the reverse was true in the cases not receiving it.

There was apparently a slight decrease in the initial loss of weight in the infants of mothers receiving the desiccated placenta over those whose mothers did not receive it, and at the end of eleven days the babies whose mothers received the agent were about four ounces heavier than those who did not. CAREY CULBERTSON.

Miller, H. A., and Chalfant, S. A.: The Treatment of Puerperal Blood Stream Infection by Means of Arsenobenzol, with Report of Cases. *Tr. Am. Gynec. Soc.*, Phila., 1918, May.

No form of intravenous medication up to the present time has been entirely satisfactory, although many have been tried. Puerperal bacteræmia has always been a very serious condition with a high mortality.

The treatment as used in these cases was followed up by experimental work by Allison. He found that arsenobenzol, together with similar preparations, could be given frequently in large doses without injury to the animals, that the mortality was less

in treated than in untreated animals, and that the injection of arsenobenzol would usually rid the blood stream of streptococci in twenty-four hours.

He also showed that there was a fall in the leucocyte count before the blood culture again became positive.

The authors have treated eleven cases of puerperal infection by means of arsenobenzol given intravenously, usually in 0.6 gm. doses as frequently as three- or four-day intervals, giving from one to four doses. There were no toxic effects other than a mild albuminuria.

Seven patients had a streptoccocus in the blood stream, with two deaths, two a Gram-negative bacillus, with no deaths, and two had a negative blood culture but were both clinically bacteræmias and both died.

Two patients had intra-uterine irrigations at two-hour intervals with Dakin's solution; one recovered and one died. In the fatal case autopsy showed the uterus free from infection. Death was due to multiple abscesses of both kidneys.

The following conclusions are drawn:

1. With the use of intravenous injections of arsenobenzol, it has been possible in every instance to rid the blood stream of its invading organism.

2. All varieties of organisms so far encountered seem to be equally influenced.

3. Cultures of localized abscesses are usually identical with cultures from the blood stream. Cultures from the uterus, although this organism predominates, are rarely pure cultures.

4. Reinfections from focal infections may and do occur, but are as readily influenced by arsenobenzol as the original infections.

5. The leucocyte count is usually low in comparison with the temperature and pulse. After arsenobenzol has been given there is a marked increase in the count. If, after this time, there is a decided decrease in the leucocytes with a corresponding improvement in the patient, including the pulse and temperature, it is very possible that the patient has reinfected herself, and arsenobenzol should be given without waiting for confirmation of this culture report.

6. The blood stream is usually found to be sterile in twenty-four hours, always in forty-eight hours, except in one case where but 4 mg. were given.

7. Rabbit experiments by Allison indicate that a dose of 6 mg. is necessary for prompt results.

8. In suspected blood stream infections arsenobenzol may be given immediately after a culture has been taken in order to avoid the delay incident to waiting for a laboratory report.

MISCELLANEOUS

Prince, E. M.: Anatomic Defects in the Newborn Demanding Surgical Operation; Report of a Case of Uterine Tumor. *J. Am. M. Ass.*, 1918, lxx, 1212.

Very young infants withstand surgical shock very well. Ether is the anæsthetic of choice. Respiratory failure is a great danger if gas-oxygen is used. Operations, even of minor nature, on infants without anæsthesia result in pain to such a degree that such a procedure is not justified.

The author reports a case of a child eleven hours old, with a hernia of such size that it contained all the large and small intestines. Ether was used as anæsthetic and the operation performed.

There was also present a cystic tumor of the uterus almost filling the abdominal cavity. This was filled with mucopurulent material. Evacuation of the contents enabled replacement of the intestines and repair of the hernia.

The endometrium was normal. The cervical canal was dilated to prevent recurrence of this condition. Recovery followed operation.

V. E. Dudman.

Heald, C. L.: Artificial Respiration in Asphyxia Neonatorum. *J. Am. M. Ass.*, 1918, lxx, 1063.

The author presents an instrument made for artificial respiration in infants which has been very satisfactory. It consists of a syringe bulb connected by rubber tubing with an air valve in the dome of a small helmet-shaped mask and by a Y-tube with an ordinary rubber toy balloon. The latter serves as a reservoir, and, as its expansile tension is about 8 mm. of mercury, it prevents the air pressure in the child's lungs from rising above that point. It also produces a uniform, steady flow of air.

After the mouth is cleared out with the gauze-covered finger, a thread on a needle is passed through the tongue to hold that organ well forward, but not outside the mouth. A towel is wrapped snugly but not tightly about the child's abdomen to prevent air from entering the stomach. While an assistant keeps the balloon inflated by compressing the bulb, the operator holds the mask, with its long diameter transversely, over the child's mouth, including the chin but not the nose. With the index finger of the same hand he manipulates the piston of the air valve, pressure on which allows the air to flow. With the finger and thumb of the other hand, he alternately compresses and releases the nostrils through which expiration takes place.

Edward L. Cornell.

GENITO-URINARY SURGERY

KIDNEY AND URETER

Nogues, P.: Kidney Traumatisms in Ambulance Service at the Front (Des traumatismes du rein dans les ambulances de l'avant). *J. d'urol.*, Par., 1918, vii, 123.

Nogues' report was made at the third reunion of the heads of the Urological Centers of the French Army held at Val-de-Grâce, October 27, 1917.

The two great symptoms in contused wounds of the kidney in war are hæmaturia and perirenal hæmatoma. The first is observed in 95 per cent of the cases. Unless primary hæmaturia is abundant, expectant treatment may be observed.

Hæmatoma when it exists is of equal value with hæmaturia as a symptom. If this has a tendency to constantly increase, it is an indication for immediate operation which may otherwise be deferred. There is however danger of the hæmatoma becoming infected if no operation is done, and there is a second danger of fibrous coating being formed around the kidney which may prevent its functioning and giving rise to a chronic sclerous perinephritis.

In gunshot kidney wounds, with the exception of a few particular cases, there is no reason why the general principles of present war surgery should not be applied, namely, clearing the trajectory, removing foreign bodies, and repairing damage done by the projectile. Nephrectomy is only performed when absolutely necessary, and conservative operations are the rule. The route of approach is usually the lumbar for an isolated kidney wound, and a median or lateral laparotomy is done when there are concomitant lesions.

Generally an immediate operation on the kidney or ureter is only indicated when there is an important hæmatoma or abundant hæmaturia. Discharge of urine through the wound does not of itself justify a nephrectomy. W. A. BRENNAN.

Grulee, C. G.: Diagnosis and Treatment of Pyelocystitis in Infancy. *Northwest Med.*, 1918, xvii, 82.

To the majority of general practitioners pyelocystitis in infancy is almost an unknown condition. Probably the chief reason that this condition is not recognized more frequently is that the symptoms as a rule do not point to the urinary tract. The onset is usually sudden with high rise of temperature and little else. Urination is not noticed to be more frequent nor is the urine irritating. In fact, the chief characteristic aside from high fever is almost entire absence of physical findings. This is so marked that it alone should lead one to think immediately of urinary infection.

Following the onset with sudden rise of temperature, the fever continues usually quite irregularly. Various types may be mentioned. There is in some instances the high continuous type of temperature, ranging from 104° to 106,° never dropping. This may lead in a few days to death. Grulee describes the physical findings which occasionally may be noted.

Naturally the examination of the urine is of greatest import. In the early stages Grulee found no pus cells but a distinct bacilluria. Within twenty-four to seventy-two hours pus makes its appearance. Red blood-cells and albumin are also found. Bacteriologically the colon bacillus is the most frequent causative factor; occasionally streptococci and staphylococci. Grulee warns against looking upon this condition of pyelocystitis lightly. The differential diagnosis is considered.

To effectively treat the disorder, the infective organism should be recognized. The colon bacillus, the common offender, does not grow well in alkaline media. Therefore large quantities of alkalies should be administered. To a young baby under six months one may give ten grains of soda bicarbonate and ten grains of potassium citrate every two hours, to be continued night and day. This treatment is continued from four days to a week. After improvement sets in hexamethylamine is given, three to five grains six times daily. During the first twenty-four hours acid sodium phosphate is given to acidify the urine. The urine is tested for formalin. Occasionally it will be found that one will not get results with the urotropin; in that case salol should be tried.

Autogenous vaccines have been repeatedly tried by the author but without results.

H. W. E. WALTHER.

Peterson, A.: The Effect on the Kidney of Ureterovesical Anastomosis; Experimental and Clinical Report. *Tr. Am. M. Ass.*, Sect. G.-U. Dis., Chicago, 1918, June.

Experiments were conducted and observations were made for the purpose of evolving a technique for the implantation of the ureter into the bladder, and to study the effect of such an operation on the kidney and the ureter. Unilateral implantations were done on 18 dogs and bilateral implantations on 3, giving a total of 24 observations. Four methods of implantation were used.

The Coffey technique consists of splitting the serous and muscular coats for three-fourths of an inch, and entering the lumen of the bowel through a small stab wound in the mucosa. The ureter is pulled well into the lumen by means of an anchoring suture placed through the split end of the ureter and tied three-fourths of an inch below its entrance. The serous and muscular coats are then approxi-

mated around the ureter, and one stay suture is placed one-fourth of an inch above the anastomosis.

The Stiles technique consists of entering the lumen of the bowel through a stab wound and approximating the intestinal wall without further dissections over the ureter; the wall of the ureter is also caught in these sutures. The Coffey and Stiles methods were used, with slight modifications, in the work in this series.

The Furniss technique consists of penetrating a double fold of the wall of the bladder with an artery forceps and pulling the severed ureter through both openings made by the forceps. The ureter is secured to the wall of the bladder by a few interrupted sutures at its lower entrance into the bladder, and the end is permitted to hang free in the cavity of the bladder. The anterior opening is then closed.

A technique suggested by Mann of the Division of Experimental Surgery and Pathology of the Mayo Clinic was used in a few of the experiments. Two parallel incisions one-fourth of an inch in length and one-half an inch apart are made at right angles to the long axis of the bladder, extending down to the mucosa. This seromuscular bridge is undermined leaving the mucosa intact. A small stab wound is made through the mucosa, at the site of the lower transverse incision. The severed ureter, having been split one-fourth of an inch on its anterior surface, is pulled beneath the bridge from above downward and anchored to the inner surface of the wall of the bladder, one-fourth of an inch below the opening. One or two interrupted sutures are made on each side of the ureter, approximating the transverse incision up to the ureter.

Observations of the end-results were made from one day to five and one-third months following the implantations. There were entirely normal kidneys and ureters in 15 instances; slight hydronephrosis in 2; marked hydronephrosis in 1; miliary abscesses of the kidney in 1; pyonephrosis in 1; normal kidney and hypertrophied ureter in 2; and the ureter pulled out in 2. Fifteen implantations, or 62.5 per cent, were complete successes. Normally functionating kidneys were found in 19, or 80 per cent. There was complete failure from stenosis, infection, and the pulling out of the ureters in five cases, or 20 per cent.

In 21 cases in the Mayo Clinic the ureter has been implanted into the bladder and the effect on the kidney has been studied. Fifteen patients had extensive resections for tumor of the bladder and implantation of one ureter. Four had ureterovaginal fistula; in one the right ureter opened into the urethra, and in one the left opened into a diverticulum. Seventeen of the 21 patients were cystoscoped from eighteen days to four and one-half years after operation. In 9 cases, or 53 per cent, of the 17 patients the function of the kidney was entirely normal. Fair function was found in 3 cases, or 18 per cent, and functionless kidneys in 5 cases, or 30 per cent. Four patients died from the fourth day to the second month after the operation; 2 showed slight dilatation of the implanted side; in 1 the pelvis was markedly dilated and in one there was no evidence of obstruction.

The author's conclusions are as follows:

1. From the experimental and clinical observations it is obvious that a normal or nearly normal kidney and ureter should result following the implantation of the ureter into the bladder.

2. The utmost care to minimize the operative trauma must be observed.

3. The placing of a forceps over the end of the ureter should be avoided.

4. No suture should enter the wall or lumen of the ureter other than the anchoring suture placed at the split extremity of the ureter, and the approximation of the wall of the bladder must be accomplished without undue compression.

5. When marked dilatation of the ureter has occurred prior to surgical interference, and when it is necessary to implant the ureter under tension, a successful result is very doubtful, and ligation is preferable to any effort of implantation.

BLADDER, URETHRA, AND PENIS

Jack, H. P.: A New Technique for Bladder Drainage. *J. Am. M. Ass.*, 1918, lxx, 1225.

Jack uses the Murphy button in bladder drainage in a manner similar to its use in intestinal anastomosis and enterostomy. One half of the button is inserted in a large rubber tube; the other half may first be surrounded down to its shank by a soft rubber ring so that it will not cut through too quickly, and placed inside the bladder through a small slit. A close approximation of the bladder tissues is made about its shank. There is now a perfect joint, and drainage may be used as much or as little as desired.

A small catheter may be placed through the button fastened in the bladder in order to insure good drainage of cavities that may be present.

The operation is done under local anæsthesia and followed in forty-eight hours by bladder irrigations every four hours. The tube may be clamped and the patient up and about if permitted.

In ten cases of prostatectomy Jack used this method with excellent results. No infections of the space of Retzius occurred. The bladder incision may be made of sufficient length to allow the search for and removal of stones; at the same time a nonleakable joint is secured by a purse-string suture which brings the edges of the bladder in close contact to the button. HARRY CULVER.

Sutton, R. L.: Subcutaneous Injections of Oxygen in the Treatment of Balanitis Gangrænosa. *J. Am. M. Ass.*, 1918, lxx, 675.

Gangrenous balanitis, though a rare disease, is a very serious infection caused by a symbiosis of the fusiform bacillus and Vincent's spirillum, both strictly anaerobic organisms.

The lesions are usually single and do not produce bubo. The local infection, usually virulent, has a peculiar characteristic odor and results in early phimosis and often severe constitutional symptoms.

Arsenic as a spirochæticide holds first place, while locally oxygen-bearing preparations are used.

A case is reported in detail which did not respond to such local agents as hydrogen peroxide and moist packs for thirty-six hours; therefore subcutaneous injections of pure oxygen by means of a hypodermic needle attached to an oxygen tank were given at four-hour intervals. Within six hours the progress of the disease was checked and in twelve hours was completely under control. Recovery with slough was uneventful. HARRY CULVER.

GENITAL ORGANS

Cook, R. L.: The Surgical Treatment of Epididymitis. *J. Am. M. Ass.*, 1918, lxx, 981.

Cook's results with the surgical treatment of gonorrhœal epididymitis have been so uniformly good that he recommends this treatment in all cases. He has operated upon 276 patients at Fort Sam Houston and their average time in the hospital has been ten days, often being put back on duty the same day on which the stitches are removed, i.e., the sixth or seventh day.

The pain is relieved at once but induration remains which does not incapacitate if a suspensory bandage is worn for several weeks.

Thirty-three per cent of his cases presented pus at operation, the removal of which he reasons will result in a better functioning organ than if it were absorbed. At the same time hydrocele is cured, which is often present.

The technique of Cook's operation varies from the usual bottle operation for hydrocele only in that the globus minor is punctured several times with a cataract knife and if pus is found a small rubber tissue drain is inserted. The skin is closed with two mattress sutures taken about one-fourth of an inch from the cut edges and pulled up tight.

Drains are removed in forty-eight hours and skin sutures in six days. HARRY CULVER.

Luys, G.: Boring Through the Prostate in the Treatment of Hypertrophy (Le forage de la prostate dans le traitement de l'hypertrophie de la prostate). *Bull. Acad. de méd.*, Par., 1918, lxxix, 141.

In treating prostatic hypertrophy Luys tunnels through the obstacles which hinder the free course of the urine. This is done through the natural passage under direct visual inspection, whether the obstacle is a prostatic bar or a consolidation of the two hypertrophied prostatic lobes.

The destruction of the obstacle is made through the author's direct vision cystoscope, and by using this it is possible to comply with the two essentials of this treatment:

1. Destruction by fire of the urethral portions of the prostatic adenoma in air and not in water, as the aspiration by means of this special cystoscope prevents accumulation of urine in the field of operation; it also allows a good view.

2. The inclined position of the patient allows a perfect differentiation of what belongs to the neck of the bladder, to the bladder, or to the prostate.

The prostatic obstruction is cut through vertically by the galvanocautery under direct vision. A V-section is then burned out, the apex being below so that a regular trench is formed. The second part of the work consists in scooping out or excavating through the lateral lobes. A regular tunnel is formed by degrees which extends from the bladder neck to the verumontanum. When this is sufficiently formed so that the cystoscopic tube glides without any difficulty through the whole prostatic urethra, the patient will not only urinate easily, but will completely empty the bladder.

The operation should not be done all at once, but it is preferable to do it in several stages separated by an interval of about a week. Three to six seances will suffice.

There may be perhaps some bleeding from the action of the galvanocautery, but electrocoagulation will immediately arrest it.

This tunneling of the prostate finds its application in a considerable number of cases where the prostate is not very large and where prostatectomy as performed at the present time is out of proportion to the symptoms observed. The operation is not dangerous and does not need either a general anæsthetic or hospitalization. It can be done in patients with renal insufficiency. Its results are not only immediate but also permanent. One of the author's patients operated upon more than four years has been re-examined and his condition continues to be perfectly satisfactory; retention has never recurred. Two capital effects are noted after the operation, namely, complete disappearance of the vesical residue, and the force of the expelled jet.

Thirty cases treated up to the time of this report have given most encouraging results.

W. A. BRENNAN.

SURGERY OF THE EYE AND EAR

EYE

Duverger: Resection of the Anterior Segment as an Operation of Urgency in War Wounds of the Ocular Globe (La résection du segment antérieur comme traitement d'urgence des plaies du guerre du globe). *Arch. d'opht.*, Par., 1917, xxxv, 705.

In most cases of severe eye injuries in war, enucleation is called for; but the operation gives a double loss; there is not only the loss of vision but there is also a deformity which prosthesis only incompletely hides. In many cases, however, the ocular globe is not entirely destroyed and the lesions are confined to the anterior segment. In such cases the author follows the rule of conduct applied to other orbital regions: immediate operation, the resection of all damaged tissues until healthy tissue is reached, the preservation of all that can be saved; and primary suture. This comprises resection of the anterior segment.

In 150 penetrating wounds of the ocular globe this operation has been carried out in 24 cases. These 24 operations done within the first forty-eight hours after injury have in every case given immediately perfect results with operative recovery in from eight to twelve days without pain and with an excellent stump. It should therefore be substituted whenever possible for enucleation or exenteration.

With regard to the possible future complications on the score of sympathetic ophthalmia, the author thinks that until there is proof to the contrary there is infinitely less susceptibility to sympathetic complications than in the case of the more extensive operations. Future experience alone will give definite indications in this regard. W. A. Brennan.

Crisp, W. H.: The History of the Operation for Cataract. *Ann. Ophth.*, 1917, xxvi, 585.

Vague records of surgical procedures for relief of blindness due to cataract are found in the earliest written accounts of civilization.

The word cataract was used as loosely among the ancients as among the laity of the twentieth century and meant a change in the appearance of the pupil with blindness; this is not strange considering that hardly a half century has elapsed since the discovery of the principle of the ophthalmoscope.

Probably for several thousand years the only operation performed for cataract was couching, and evidence points to its being first performed by the ancient Indians. The Arabs of the middle ages describe two methods of couching, one that of the Greeks in which the lens was depressed by means of a sharp needle thrust into the eye, and a second in which a blunt needle was introduced through an opening made in the sclera with a knife.

The native operators in India now are itinerants known as Vydians, and it is considered probable that over forty per cent of the eyes on which couching is done by them are lost by sepsis. While their work is now forbidden by the British Government, it should be recognized that for centuries countless numbers have owed their vision to the operations of native workers and the procedure is referred to as one of the greatest achievements of ancient surgery.

For at least two thousand years it was believed that cataract consisted in something placed before the lens and it was not until 1682 that it was demonstrated by dissection that the opacity was in the lens itself.

The modern method of cataract extraction was established by Daviel in 1745 and was done without anæsthesia. The operation as performed today is essentially that devised by him a hundred and seventy years ago. S. S. Howe.

Spencer, F. R.: The Rôle of the Ductless Glands in Ophthalmology. *Colorado Med.*, 1918, xv, 41.

Because ductless gland disorders are often seen first by the oculist owing to headaches or predominating eye symptoms, the author urges more consideration of the subject by opthalmologists and discusses the glands in their relation to the eye.

Referable to the thyroid, twenty symptoms are described, the majority of which are explainable by stimulation of the sympathetic.

Insufficiency of the parathyroids is held responsible for zonular cataract, convulsions of childhood, tetany, eclampsia, and epilepsy.

Eye symptoms due to the pineal and pituitary glands are those of pressure caused by hyperplasia, and in pituitary derangement contraction of the visual fields and homonymous hemianopsia occur early.

Thymus hypersecretion produces the opposite effects from the thyroid, contracted pupils, narrow palpebral apertures, etc., resulting. Thymus feeding with radium and X-ray treatment remarkably improved patients who had not been benefited by thyroidectomy for exophthalmic goiter.

The adrenals produce their effect on the eye by stimulation of other glands and the sympathetic.

Three cases with eye symptoms referable to the ductless glands are cited. S. S. Howe.

Green, A. S., and Green, L. D.: Dakin's Dichloramine-T Solution for Ocular Infections. *J. Am. M. Ass.*, 1918, lxx, 1212.

The authors report four cases of protracted conjunctivitis in which a rapid recovery followed the use of Dakin's solution, 0.5 per cent strength, in oil.

They call attention to the great difficulty in finding a germicide which is effective without injuring the tissues. Their experience with Dakin's solution encourages them to experiment with stronger solutions. EMORY HILL.

EAR

Heitger, J. D.: The Application and Interpretation of the Newer Ear Tests. *J. Indiana St. M. Ass.*, 1918, xi, 135.

After a short historical introduction, the author gives the technique as worked out by Jones and his associates.

Speaking of the interpretation of the tests, the author mentions the following data as suggestive of a peripheral lesion:

1. A proportionate impairment of the function of the cochlea and kinetic-static labyrinth.
2. History or presence of tinnitus.
3. Proportionate impairment of the responses from the vertical canals and from the horizontal canals.
4. A proportionate impairment of nystagmus and vertigo.

On the other hand, the following suggest a central lesion:

1. Normal cochlea with impaired or non-responsive canals.
2. Normal responses from the horizontal canal, but impaired responses from the vertical canals, or vice versa.
3. Normal nystagmus but impaired vertigo from the horizontal canal, or vice versa.
4. Normal nystagmus, but impaired vertigo from the vertical canals, or vice versa.
5. Normal nystagmus and vertigo from any semicircular canal but (a) impaired past pointing in any direction of any extremity, or (b) impaired or absent normal falling.
6. Spontaneous vertical nystagmus.
7. Non-responsive semi-circular canals of one side and a nystagmus to that side.
8. The production of conjugate deviation of the eyes instead of nystagmus. OTTO M. ROTT.

Black, W. D.: Indications for the Radical Mastoid Operation in Chronic Suppurative Otitis. *J. Missouri St. M. Ass.*, 1918, xv, 121.

The author divides the indications for the radical mastoid operation into two classes: the indications for immediate operation, and the indications for a deferred operation.

The immediate operation is done to save life in such cases as present severe and dangerous complications, such as otitic brain abscess, epidural abscess, cerebellar abscess, thrombosis of the lateral sinus, extensive cholesteatomata, beginning symptoms of meningitis of otitic origin, sudden facial paralysis, labyrinthitis, or labyrinthine irritation.

The deferred operation is indicated for the relief of symptoms such as a discharge which resists the more conservative procedures for two or three months; gradual reduction in the hearing when hearing in the other ear is good; pain in the ear, over the mastoid or over the side of the head; headache, particularly if it is less when the discharge increases; fever and malaise; vertigo; where life insurance is desired. OTTO M. ROTT.

Lyon-Mercado, M.: A Note on the After-Treatment of the Radical Mastoid Operation. *Lancet*, Lond., 1918, cxciv, 373.

The author gives the results of a series of 25 operations performed within the last year.

The subjective symptoms and objective indications of the 25 cases are tabulated as follows:

1. Fetid discharges varying from over one to six years' duration, in 10 cases.
2. Purulent discharges of two years' standing, with symptoms of headache, vomiting, vertigo, and optic neuritis, in 2 cases.
3. Fistulous opening into the mastoid with cholesteatoma, 1 case; with cholesteatoma alone, 4 cases.
4. Tuberculous disease of the mastoid (a) with facial paralysis of five months' duration before operation; and (b) with no facial paralysis, in 2 cases.
5. Existing middle-ear disease with lateral sinus phlebitis and thrombus in lateral sinus, 2 cases.
6. Fetid discharge of two years' standing with (a) single polypi; and (b) multiple polypi, 4 cases.

The posterior operative wound, except in the lateral sinus cases, was closed at the time of operation and healed by first intention. Unless there was œdema, intense pain, or a rise in temperature, there was no need to dress the cases until the fifth morning. The mastoid antrum was syringed through the external conchameatal opening, made expressly for drainage, with 3 ounces of hydrogen peroxide diluted one-half, or fresh eusol in half strength. The mastoid antrum was then cleaned out with two strips of ribbon-gauze soaked in a solution of picric acid, ½ per cent, in methylated spirit, 7½ per cent. The ribbon-gauze varied from six to ten inches in length. A third strip of ribbon-gauze soaked in the same solution was lightly packed into and left in the mastoid antrum until the next dressing.

After the first dressing alternate day dressings only are required. The amount of packing left in the mastoid antrum is lessened as it begins to heal over. About the fourth week the packing is discontinued, the ear being merely syringed.

OTTO M. ROTT.

SURGERY OF THE NOSE, THROAT, AND MOUTH

NOSE

Baum, H. L.: Two Cases of Nasopharyngeal Polypus Originating in the Maxillary Sinus. *Laryngoscope*, 1918, xxviii, 180.

In the first case, the antrum was entered through the canine fossa and the cavity found filled with a cystic polyp which had its attachment on the nasal wall of the antrum. The nasopharyngeal portion was firm and fibrous, a fibromyxoma. The antral portion was cystic. The junction of the two portions was fibrous. Histologically the nasal portion showed stratified squamous epithelium, this change showing that disease and pressure had modified the epithelial type from the columnar to the squamous form.

Similar changes occurred in the second case.

OTTO M. ROTT.

Veyrassat: Nasal Prosthetics by Tibial Bone Graft (A propos d'une mutilation du nez par balle explosive traitée par la prothèse osseuse tibiale). *Rev. méd. de la Suisse Rom.*, 1917, xxxvii, 754.

Veyrassat got an excellent result by a tibial bone graft in a nasal deformity due to gunshot injury. The conditions which he considers necessary to success in a case of bone graft are: (1) absolute asepsis; (2) absence of hæmorrhage; hæmostasis must be assured in order to avoid postoperative hæmatomata and the shedding of the graft; (3) preservation of the periosteum in a bone graft; (4) rapidity of application of the graft after its removal.

He thinks that in the case of the nose, when grafts are applied by the submucous route they often give rise to hæmorrhages which are difficult to control; hence unless contra-indicated for essential reasons, the external method is better. He also prefers a general anæsthetic because local infiltrations of novocaine or cocaine are liable to compromise the vitality of the tissue in the vicinity.

W. A. BRENNAN.

THROAT

Dean, L. W., and Gregg, J. B.: An Implantation Cyst of the Larynx. *Laryngoscope*, 1918, xxviii, 74.

The author reports a case of implantation cyst of the larynx which occurred in a patient who had previously been treated for tuberculous laryngitis and states that no other case of this laryngeal tumor appears in the literature. After defining implantation cysts, discussing their presence in the skin, cornea and iris, and referring to the other types of laryngeal cysts, he concludes that in laryngeal tumors following operative procedure, especially when not accompanied by evidence of inflammation, the diagnosis of implantation cyst must be considered.

H. H. FREILICH.

MOUTH

New, G. B.: The Use of Heat and Radium in the Treatment of Cancer of the Jaws and Cheeks. *Tr. Am. M. Ass.*, Sect. Stomatol., Chicago, 1918, June.

The author reports the results of the treatment in the Mayo Clinic during 1917 of 21 patients with cancer of the jaw and cheek without glandular involvement. The method of treatment consists of the thorough cauterization of the growth with slow heat for from twenty to forty-five minutes. A soldering iron and a water-cooled retractor are the most satisfactory means of cauterization. This is followed by radium treatment.

It is essential that the patients be seen once a month after the treatment so that if there is any recurrence they may have immediate care. Of the 21 patients treated, 20 were traced; of these 14 have been free from local recurrence for from six to eighteen months. One patient who was recauterized three months previously thus far has no recurrence. One died of lymphatic leukæmia six months after operation; there was no recurrence. Two of the 14 patients developed glands of the neck and have had block dissections done. Thus 12 of the 20 patients have had no recurrence locally or in the glands of the neck for from six to eighteen months. One patient, who had been operated upon before coming to the Clinic, had a hopeless local recurrence. Two patients died of the cancer; one had been operated upon before coming to the Clinic; one consulted a plaster doctor, and his condition cannot be learned. There was no operative mortality.

This group of cases shows that the immediate results in the treatment of epithelioma of the jaws and cheeks without glandular involvement, by the use of the cautery and radium, have been very encouraging. The end-results cannot be foreseen but it is believed that by the addition of radium to the treatment much more is being accomplished than formerly.

Shearer, W. L.: A Few Principles of Harelip and Cleft Palate Procedure. *Med. Herald*, 1918, xxxvii, 79.

Shearer recommends the Brophy operation in patients having a cleft of the palate, alveolar process, and lip. In the first operation, he recommends closing the alveolar cleft by lead plates fitted against the buccal surfaces of the arch. Silver wires are passed through the molar bone just under

the floor of the orbit on either side. These wires also pass through the lead plates and then are twisted so as to bring the borders of the cleft together.

After this is accomplished, the mucosa is dissected from the bone so that the bone tissue will unite. In the next operation the lip is closed and in the third operation he closes the cleft of the soft palate.

To accomplish the best results, Shearer recommends that the first operation should be done from the ages of ten days to six or eight weeks, and that the lip and soft palate should not be considered until there is bone union. M. N. FEDERSPIEL.

Blum, T.: Mouth Surgery, with Special Reference to Cysts of the Jaws. *Med. Rec.*, 1918, xciii, 634.

Attention is called to the importance of making diagnoses of various pathological conditions involving the jaws. Blum claims that a large number of cases of apical infections can be cleared up without tooth extraction. This is done by root amputation, consisting of the removal of the apex of the tooth and curettage of the apical area by an incision made through the gum tissue. Blum also states that most of the bone infections of the jaws are caused by diseased teeth. He speaks of the need of recognizing radicular cysts, follicular cysts, odontoma, unerupted wisdom teeth, and ranula.

M. N. FEDERSPIEL.

Churchman, J. W.: Fibroma of the Tongue with Consideration of Other Tumors of the Tongue and Certain Technical Points in Tongue Resection. *Med. & Surg.*, 1918, ii, 173.

The average surgeon classifies tumors of the tongue as either benign, fibroma or cyst, granuloma, tuberculous or syphilitic, or carcinoma. The following new-growths have been reported in the last twenty years:

1. Benign tumors: papilloma, lipoma, leiomyoma, fibroma, tumors of an aberrant thyroid gland; chondroma, osteoma, plasmoma, angioma; cysts, congenital, thyrolingual, dermoid, degenerative, hydatid.

2. Malignant tumors: epithelioma, sarcoma, endothelioma, lymphangioma, amyloid tumor. Fibroma of the tongue is very rare and when present may resemble a cyst. Diagnosis is only possible microscopically.

Sarcoma is also rare. Aids in diagnosis are the occurrence, equally frequent in both sexes; the overlying epithelium is unbroken; there is no gland involvement. It is the author's opinion that in these cases the simple removal of a wedge-shaped section of the tongue gives as good a prognosis as a more radical resection. In the case reported by the author this was done and convalescence was uneventful and a perfectly functionating tongue resulted.

As regards the technique of operations on the tongue, the inside of the mouth is never touched by knife. Entire resection is done with a cautery. Hæmorrhage is further controlled by silk stay sutures placed in the tongue posteriorly to the resection. The author does the hemi-resection. The operation is done by first removing the glands of both sides of the neck, and two or three weeks later the tongue resection is done by the jaw-splitting operation. To prevent a persistent sinus of the jaw the author prefers wiring the teeth rather than the fragments. I. E. BISHKOW.

Thoma, K. H.: The Histological Pathology of Alveolar Abscesses and Diseased Root-Ends. *Dental Cosmos*, 1918, lx, 13.

In a histopathological study of alveolar abscesses and diseased root-ends, Thoma describes the tissue changes which take place at root-ends. The alveolar abscesses caused by diseases of the dental pulp involve two distinct chains of pathological processes. The first is spoken of as the acute alveolar abscess, a process of destruction; the second is of a constructive nature called a granuloma. The acute condition usually terminates in the formation of granulation tissue and is nature's attempt at healing.

The dental granuloma is placed between pure inflammation and neoplasm. Microscopically, it is a distinct chronic inflammation usually found at root-ends, increasing at the expense of the surrounding bone.

If there are epithelial cells at the points of irritation due to the chronic inflammatory condition, a proliferation occurs and dividing and branching chains of epithelial cells will be found which grow like a net-work through the lesion, a frequent forerunner of cyst formation.

Alveolar abscesses also tend to produce root-end necrosis. In many cases there is a tendency for the fibers and cells of the peridental membrane to have a wonderful resistance to disease. This may result in the formation, layer upon layer, of a new cementum which causes an enlargement of the root-end.

M. N. FEDERSPIEL.

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GENITO-URINARY SURGERY

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SURGERY OF THE NOSE, THROAT, AND MOUTH

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